Naval Weapons Systems Training Facility Boardman

Final Environmental Impact Statement

December 2015

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Military Readiness Activities at Naval Weapons Systems Training Facility Boardman

Final Environmental Impact Statement

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FINAL ENVIRONMENTAL IMPACT STATEMENT for

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN

Lead Agency for the Environmental Impact Statement: United States Department of the Navy

Title of the Proposed Action: Military Readiness Activities at Naval Weapons Systems Training Facility Boardman

Designation: Environmental Impact Statement

Abstract

This Environmental Impact Statement (EIS) has been prepared by the United States (U.S.) Department of the Navy (Navy) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code §4321 *et seq.*), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [C.F.R.] §§1500-1508), and Navy Procedures for Implementing NEPA (32 C.F.R. §775). The Navy is the lead agency for this EIS pursuant to 40 C.F.R. §1501.5 and the National Guard Bureau (NGB) and Federal Aviation Administration (FAA) are cooperating agencies pursuant to 40 C.F.R. §1501.6. The Commander, U.S. Pacific Fleet signed a Memorandum of Agreement with the NGB and the Oregon National Guard (ORNG) to establish the lead-cooperating agency relationship (August 8, 2010). The ORNG is the NGB's executing agent of this Memorandum of Agreement. Since the Proposed Action contemplates activities associated with special use airspace, the Navy requested the FAA's cooperation in accordance with the guidelines described in the Memorandum of Understanding between the FAA and the Department of Defense (DoD) Concerning Environmental Review of Special Use Airspace Actions, dated October 4, 2005. Congress has charged the FAA with administering all navigable airspace in the public interest as necessary to ensure the safety of aircraft and the efficient use of such airspace. The FAA is the agency with jurisdiction by law and special expertise to those portions of the Naval Weapons Systems Training Facility (NWSTF) Boardman proposal regarding establishment of new airspace under FAA Order 1050.1 and Joint Order 7400.2.

The purpose of the Proposed Action is to achieve and maintain military readiness. This action is needed to provide a training environment consisting of ranges, training areas, and range instrumentation. Three alternatives are analyzed in this EIS.

The No Action Alternative will continue training activities of the same types and at same levels of training intensity and frequency as currently conducted at NWSTF Boardman, without a change in the nature or scope of military activities.

Alternative 1, in addition to accommodating training activities addressed in the No Action Alternative, would support an increase in the types of training activities and the number of training events conducted at NWSTF Boardman, accommodate force structure changes, and provide enhancements to training facilities and operations at NWSTF Boardman. The range enhancements analyzed under Alternative 1 to meet Navy and ORNG training requirements would include the construction and operation of a Multipurpose Machine Gun Range, a Digital Multipurpose Training Range (DMPTR), an eastern Convoy Live Fire Range, a Demolition Training Range, a Range Operations Control Center and Unmanned Aircraft Systems (UAS) Training and Maintenance Facility (housed in a single building) with small airstrip, as well as the designation of a drop zone. An additional Military Operations Area (MOA) to join existing restricted airspace would be created and would be called the Boardman Low MOA. Also, an

extension would be made to the existing Boardman MOA in the northeast area of Boardman airspace (Boardman MOA, Proposed Extension). This new training airspace and airspace expansion would be 46 square nautical miles and join the current Boardman R-5701A, R-5701B and R-5701C and the existing Boardman MOA (Figure 2-5). Low-altitude flight tracks would be oriented to facilitate the use of this additional MOA, avoiding existing and planned wind turbines in the vicinity of NWSTF Boardman (Figure 2-6).

Alternative 2 would include all training and range enhancement elements of Alternative 1 (with the exception of construction and operation of the DMPTR). Due to the changing fiscal priorities impacting the DoD and the services, as well as changing priorities necessary to meet mission requirements, the NGB and ORNG are evaluating Alternative 2 without the proposed DMPTR. Under Alternative 2, the DMPTR would not be constructed or operated. In addition, under Alternative 2, three mortar pads would be established, a second (western) Convoy Live Fire Range and a Range Operations Control Center (separate from the UAS Training and Maintenance Facility) would also be constructed.

This EIS addresses the potential environmental impacts that result or could result from activities under the No Action Alternative, Alternative 1, and Alternative 2. Environmental resources evaluated include soils, air quality, water quality, noise, vegetation, wildlife, land use and recreation, socioeconomics and environmental justice, transportation, cultural resources, American Indian traditional resources, public health and safety and protection of children. Due to comments made during public scoping, this EIS also evaluates the potential for wildfire that could result from activities under the No Action Alternative, Alternative 1, and Alternative 2. This EIS also addresses the cumulative impacts of the direct and indirect effects of past, present, and reasonably foreseeable future actions coupled with the Proposed Action on the human environment.

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TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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ES EXECUTIVE SUMMARY

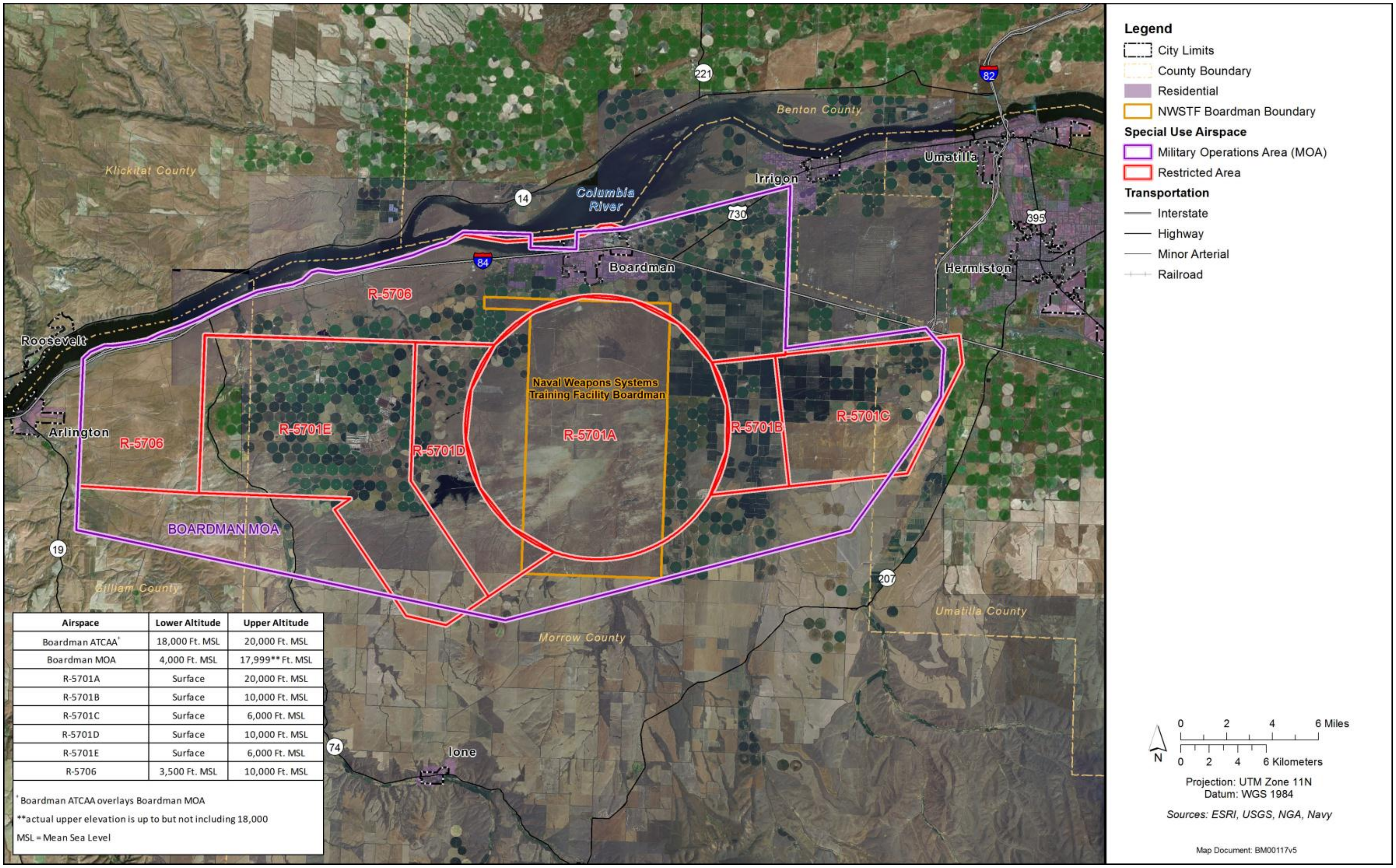
ES.1 INTRODUCTION AND BACKGROUND

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] §4321 *et seq.*) requires federal agencies to examine the environmental effects of major federal actions that may have significant impacts in an Environmental Impact Statement (EIS). An EIS is a public document that provides a detailed assessment of the potential effects that a major federal action may have on the human, natural, or cultural environment. The United States (U.S.) Department of the Navy (Navy) prepared this EIS (hereafter referred to as "EIS") to assess the potential environmental effects associated with ongoing and proposed Navy and Oregon National Guard (ORNG, which is comprised of the Oregon Army and Air National Guards) training activities (described in detail in Chapter 2, Description of Proposed Action and Alternatives) within the Naval Weapons Systems Training Facility (NWSTF) Boardman (Figure ES-1). The Navy is the lead agency for this EIS pursuant to 40 Code of Federal Regulations (C.F.R.) §1501.5 and §1508.5 and the U.S. National Guard Bureau (NGB) and Federal Aviation Administration (FAA) are cooperating agencies pursuant to 40 C.F.R. §1501.6. The Commander, U.S. Pacific Fleet signed a Memorandum of Agreement with the NGB and the ORNG to establish the lead-cooperating agency relationship (August 8, 2010). The ORNG is the NGB's agent for execution of this Memorandum of Agreement. The NGB is the federal instrument responsible for the administration of the National Guard of the United States established by the U.S. Congress as a joint bureau of the Department of the Army (Army) and the Department of the Air Force. Since the Proposed Action contemplates activities associated with Special Use Airspace (SUA), the Navy requested the FAA's cooperation (January 10, 2012) in accordance with the guidelines described in the Memorandum of Understanding between the FAA and the Department of Defense (DoD) concerning SUA Environmental Actions, dated October 4, 2005.

This EIS was prepared in compliance with NEPA (42 U.S.C. §4321 *et seq.*); Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 C.F.R. §§1500–1508), Navy Procedures for Implementing NEPA (32 C.F.R §775); FAA's Policies and Procedures for Considering Environmental Impacts (FAA Order 1050.1 Series); and Environmental Analysis of Army Actions (32 C.F.R. §651), which also covers Army National Guard activities.

The Navy's mission is to organize, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. This mission is mandated by federal law (10 U.S.C. §5062), which ensures the readiness of the United States' naval forces. The Navy executes this responsibility by establishing and executing training programs and ensuring naval forces have access to the ranges, operating areas, and airspace needed to develop and maintain skills for conducting naval activities.

The ORNG has a dual state and federal mission to "provide the citizens of the State of Oregon and the United States with a ready force of citizen soldiers and airmen, equipped and trained to respond to any contingency." A key component of the nation's defense, the National Guard's federal mission is "to provide trained units and qualified persons available for active duty in the armed forces, in time of war or national emergency, and at such other times as the national security may require, to fill the needs of the armed forces whenever more units and persons are needed than are available in the regular components" (10 U.S.C. §10102). The ORNG is also an asset to the state of Oregon during emergencies caused by natural disasters, civil disturbances, acts of terrorism, and other threats to life, property, or civil order. As Commander in Chief of the ORNG, the Governor of Oregon may order the ORNG to duty in order to fulfill State mission requirements.



Airspace	Lower Altitude	Upper Altitude
Boardman ATCAA*	18,000 Ft. MSL	20,000 Ft. MSL
Boardman MOA	4,000 Ft. MSL	17,999** Ft. MSL
R-5701A	Surface	20,000 Ft. MSL
R-5701B	Surface	10,000 Ft. MSL
R-5701C	Surface	6,000 Ft. MSL
R-5701D	Surface	10,000 Ft. MSL
R-5701E	Surface	6,000 Ft. MSL
R-5706	3,500 Ft. MSL	10,000 Ft. MSL

* Boardman ATCAA overlays Boardman MOA
**actual upper elevation is up to but not including 18,000
MSL = Mean Sea Level

Figure ES-1: Naval Weapons Systems Training Facility Boardman Military Operations Area and Restricted Areas

The mission of the NGB is to participate with the Army and the Air Force staffs in the formulation, development, and coordination of all programs, policies, concepts, and plans pertaining to or affecting the National Guard (which includes the Army National Guard and the Air National Guard of the United States). The NGB develops and administers such detailed operating and funding programs as are required for the operation of the Army National Guard and the Air National Guard, based on approved programs, policies, and guidance from the U.S. Department of the Army and the U.S. Department of the Air Force. The NGB also participates with and assists states in the organization, maintenance, and operation of their National Guard units to provide trained and equipped units capable of immediate expansion to war strength, and make the units available for service in time of war or emergency to augment the active Army and Air Force.

ES.2 Strategic Importance of Naval Weapons Systems Training Facility Boardman

NWSTF Boardman is the principal regional air-to-ground range, providing the only terrestrial impact area and restricted low altitude training airspace for use by Naval Air Station (NAS) Whidbey Island-based student and fleet aircrew and ORNG units. NWSTF Boardman and its associated airspace are also used for training (including Unmanned Aircraft System [UAS] training) by ORNG units located throughout the state of Oregon. NWSTF Boardman and its associated airspace also support occasional training requirements of other DoD units and the SUA is used by DoD offices to conduct UAS testing and training. Accordingly, the strategic vision for NWSTF Boardman is to support naval and joint operational readiness by providing a realistic, live-training environment with the capability and capacity to support the Services' current, emerging, and future training requirements and UAS testing requirements. NWSTF Boardman has a unique combination of attributes that make it a strategically important training venue for the Services as presented in the sections below.

ES.2.1 Location

NWSTF Boardman serves as a regional range for Naval units homeported in the Pacific Northwest area including aviation units homeported at NAS Whidbey Island. NWSTF Boardman is located approximately 225 miles (368.3 kilometers) southeast of NAS Whidbey Island. NWSTF Boardman also is located within an acceptable travel distance for the majority of the ORNG's soldiers and airmen, which ensures that the actual time spent training during a training assembly is maximized. Individual Guard training typically occurs at Army National Guard organizational armories, readiness centers, maintenance shops, and training sites on a regular basis. Collective training of troops in the field during Annual Training occurs at larger training sites. Consequently, non-value added travel time must be kept to a minimum (less than 25 percent according to Army Regulation 350-2 and NGB guidance) to ensure that all training tasks and qualifications can be met annually.

The Pacific Northwest region is home to thousands of military families. The military services strive, and in many cases are required, under Chief of Naval Operations Instruction 3000.13, to track and, where possible, limit "personnel tempo," meaning the amount of time that military personnel spend deployed away from home. Personnel tempo is an important factor in family readiness, morale, and retention. The availability of NWSTF Boardman and its associated airspace as a regional training range is critical to Navy and ORNG efforts in these administrative (or personnel) support functions. Delegated SUA associated with NWSTF Boardman is essential to support realistic training opportunities to Navy, U.S. Marine Corps, Air Force, and National Guard manned and unmanned aircraft (see Figure ES-1). Detailed descriptions of these areas are provided in Section 1.3.4 (Description of NWSTF Boardman Training Areas).

ES.2.1.1 Training Supported

NWSTF Boardman plays a vital role in the execution of the military readiness mandate. This training area is the Pacific Northwest's only venue for Basic phase/Unit-level air-to-ground bombing practice, Low Altitude Tactical Training (LATT), and Surface to Air Counter Tactics (SACT) for Naval aviation squadrons. In addition, NWSTF Boardman supports ORNG and U.S. Air Force Reserve training requirements, and UAS testing and training conducted by the DoD and ORNG. Training at NWSTF Boardman is critical to the preparation of the Services for advanced level training and predeployment certification.

ES.3 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to achieve and maintain military readiness by using a weapons training facility within acceptable travel distance for ORNG and Navy personnel that has appropriate air-to-ground ranges, terrestrial impact areas, and SUA to support and conduct current, emerging, and future training and research, development, testing, and evaluation activities, while enhancing training resources through investments on the range. Additionally, the purpose of the Proposed Action is to achieve the requirements set forth in the Navy Required Capabilities Document of September 8, 2005 and the U.S. Army Forces Command/Army National Guard/U.S. Army Reserve Regulation 350-2, U.S. Army Reserve Regulation 350-1, and Department of the Army Pamphlet 350-8.

A weapons training facility with these capabilities is essential to maintain military readiness because of the unique training environment it provides. Approval of the Proposed Action is required to support the following in the Pacific Northwest:

- Ensuring that NWSTF Boardman continues to support critical military training activities in a realistic and cost-effective manner;
- Achieving and maintaining military readiness using NWSTF Boardman to support and conduct current, emerging, and future training and research, development, testing, and evaluation activities; and
- Upgrading and modernizing NWSTF Boardman's existing capabilities to address training range shortfalls in Oregon and the Pacific Northwest.

Approval of the Proposed Action is needed to provide an essential piece of the real-world training environment consisting of ranges, training areas, and range instrumentation with the capacity and capabilities to fully support required training tasks for operational units and personnel utilizing NWSTF Boardman. In this regard, NWSTF Boardman furthers the military's execution of its roles and responsibilities under U.S.C. Title 10 (federal military) and Title 32 (State National Guard). To comply with its Title 10 and 32 mandates, the military needs to maintain current levels of military readiness through improvement of training at NWSTF Boardman, accommodation of possible future increases in operational training, and maintenance of the long-term viability of NWSTF Boardman as a military training and testing area.

The Navy and ORNG have developed alternatives selection criteria pursuant to 40 C.F.R. §1502.14, which are discussed in Chapter 2 (Description of Proposed Action and Alternatives), based on this statement of the purpose and need.

ES.4 The Environmental Review Process

NEPA requires federal agencies to examine the environmental effects of their Proposed Actions. This EIS is a detailed public document that provides an assessment of the potential environmental impacts associated with a proposed major federal action. The impacts to be analyzed are those that occur to the human environment, including natural and physical resources.

ES.4.1 National Environmental Policy Act Public Participation

The first step in the NEPA process (pursuant to 40 C.F.R. §§1501–1508) is the preparation of a Notice of Intent (NOI) to develop the EIS. The NOI provides an overview of the Proposed Action and the scope of the EIS (Appendix A). The NOI for this project was published in the Federal Register (FR) on October 5, 2010 (75 FR 61452), and throughout October 2010 in six local newspapers (East Oregonian, Tri-City Herald, Oregonian, Hermiston Herald, North Morrow Times and Heppner Gazette-Times), which cover Boardman, Pendleton, Hermiston, and the general northeast Oregon region. The NOI and newspaper notices included information about comment procedures, the length of the comment period (41 days), the project website address (http://www.NWSTFBoardmanEIS.com), a list of information repositories (public libraries), and the dates and locations of the scoping meetings.

Scoping is an early and open process for developing the "scope" of issues to be addressed in the EIS. The scoping meetings for this EIS (held in Boardman, Oregon and Hermiston, Oregon) were advertised in local newspapers. The advertisements invited public attendance to help define and prioritize environmental issues and how to convey these issues to the Navy (see Appendix G for information on the scoping meetings). Comments from the public, as well as from agencies and public interest groups, including the development of alternatives, have been considered in the preparation of this EIS.

A separate and additional scoping effort was conducted by the Navy and the ORNG to address the inclusion of an additional proposed action, a Military Operations Area (MOA) that would join the current airspace to the northeast of existing NWSTF Boardman Airspace. The additional NOI for this new proposed action was published in the Federal Register on December 27, 2011 (76 FR 80910), and throughout December 2011 and January 2012 in five local newspapers (East Oregonian, Tri-City Herald, Hermiston Herald, North Morrow Times, and Heppner Gazette-Times), which noted a 30-day public comment period. At the request of commenters, this comment period was extended from an original period of 30 days to a total of 62 days.

Subsequent to the scoping process, the Draft EIS was prepared to assess the potential effects of the Proposed Action and alternatives on the environment. A Notice of Availability for the Draft EIS was published in the Federal Register on September 7, 2012 (77 FR 55213), and notices were placed in the aforementioned newspapers announcing the availability of the Draft EIS. The Draft EIS was available for general public and agency review and was circulated for review and comment between September 7 and November 6, 2012. An amended Notice of Availability was published on November 9, 2012 (77 FR 67362), which extended the public comment period to December 6, 2012. A Notice of Public Meetings to receive public comments on the Draft EIS was published in the Federal Register on September 7, 2012 (77 FR 55195) and were held on September 25, 2012 in Hermiston, OR, and September 26, 2012 in Boardman, OR. Refer to Appendix G for more information on the public notification process and the public meetings, the Navy's response to all public comments (35 total comments received) on the Draft EIS, and transcripts of the public meetings.

In this Final EIS, the Navy has made changes to the Draft EIS based on comments received during the public comment period. These changes included factual corrections, additions to existing information, and improvements or modifications to the analyses in the Draft EIS.

The Record of Decision will reflect the Navy's final decision on the Proposed Action, the rationale behind that decision, and any commitments to monitoring and mitigation. The Record of Decision will be signed by the Navy following the issuance of this Final EIS and completion of a 30-day wait/review period. A Notice of Availability of Record of Decision will be published in the Federal Register, and the Record of Decision will be distributed to agencies and interested parties, and posted on the NWSTF Boardman EIS website. The Record of Decision will also be announced in local newspapers.

ES.5 Executive Order 13175 Consultation and Coordination with Indian Tribal Governments

In accordance with EO 13175, DoD policies and Navy instructions, Commander U.S. Pacific Fleet invited government-to-government consultation with the Confederal Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe to government-to-government consultation.

ES.6 Proposed Action and Alternatives

The Proposed Action involves the construction and operation of new range facilities and changes in existing training and testing activities at NWSTF Boardman. The Proposed Action would result in enhancements and increases in training and testing that are necessary to ensure NWSTF Boardman supports military training and readiness objectives. Actions to support current, emerging, and future training and testing activities at NWSTF Boardman will be evaluated in this EIS. The components of the Proposed Action stem from U.S. Navy training requirements (Fleet Response Training Plan) and other military training requirements, including Army Regulation 350-1, *Army Training and Leader Development*; Army Regulation 350-2, *Reserve Component Training*; Department of the Army Pamphlet 350-38, *Standards in Training Commission*; and ORNG regulations and policies. In general, the Proposed Action would:

- Increase the types of training activities and the number of training events conducted at NWSTF Boardman
- Accommodate force structure changes
- Provide enhancements to training facilities and operations at NWSTF Boardman and its associated SUA
- Establish an additional MOA to join existing restricted airspace (Boardman Low MOA) and establish an extension to the existing Boardman MOA in the northeast area of Boardman airspace (Boardman MOA, Proposed Extension).

ES.7 No Action Alternative: Baseline Training and Access Restrictions

Each military activity described in this EIS meets a requirement that can be ultimately traced to the National Command Authority.[1] Over the years, the tempo and types of activities have fluctuated at NWSTF Boardman due to changing requirements, the dynamic nature of international events, the introduction of advances in warfighting doctrine and procedures, and force structure changes. Such developments have influenced the frequency, duration, intensity, and location of required training. The

[1] The National Command Authority is a term used by the U.S. military and government to refer to the ultimate lawful source of military orders. The term refers collectively to the President of the United States (as Commander in Chief) and the U.S. Secretary of Defense.

factors influencing tempo and types of activities are variable by nature, and will continue to cause fluctuations in training activities on NWSTF Boardman and in its associated airspace. Accordingly, training and testing activity data used throughout this EIS are a representative baseline (based on historical information collected from 2007 to 2010) for evaluating impacts that may result from the proposed training and testing activities, and is presented as the No Action Alternative.

Training activities at NWSTF Boardman would continue to vary from basic individual to unit level events of relatively short duration involving few participants. ORNG Soldiers would continue to be transported long distances to use out-of-state training ranges, dependent on the ability to schedule the use of those ranges, to meet qualification and training requirements that cannot be met at existing ORNG facilities. The Navy would continue to use the currently available airspace and provide the range operations support. Evaluation of the No Action Alternative in this EIS provides a baseline for assessing environmental impacts of Alternative 1 and Alternative 2, as described in the following subsections.

ES.8 Alternative 1 – Increase Training Activities, Accommodate Force Structure Changes, and Implement Required Range Enhancements

Alternative 1 would include all current training and testing activities described under the No Action Alternative, and could include the establishment and use of an additional MOA to the northeast of existing NWSTF Boardman airspace, an increase in existing training activities, new training and testing activities, and range enhancements to meet Navy and ORNG training requirements. Some ongoing training activities could increase or change as a result of force structure changes associated with the introduction of new aircraft or other equipment. The following proposed range enhancements would support new training and testing activities and some ongoing activities (Figure 2-4):

- Establishment and use of an additional MOA (Boardman Low MOA) to the northeast of existing NWSTF Boardman airspace and expansion of current Boardman MOA to the northeast of existing NWSTF Boardman airspace
- Construction and operation of an Army-standard Multipurpose Machine Gun Range, with a heavy sniper lane, and associated support facilities
- Construction and operation of an Army-standard Digital Multipurpose Training Range (DMPTR) and associated support facilities
- Construction and operation of an eastern Convoy Live Fire Range (CLFR)
- Construction and operation of a Demolition Training Range
- Construction and operation of a single building housing a Range Operations Control Center and UAS Training and Maintenance Facility with small airstrip
- Designation and establishment of a Drop Zone to accommodate parachute operations of personnel and small-medium sized equipment (Containerized Delivery Systems)

ES.9 Alternative 2 – Increase Training Activities, Accommodate Force Structure Changes, and Implement Desired Range Enhancements (Preferred Alternative)

Implementation of this alternative would include all elements of Alternative 1 (accommodating training activities currently conducted, increasing training activities, accommodating force structure changes, and implementing required range enhancements), with the exception of those elements associated with the DMPTR. Due to the changing fiscal priorities impacting the DoD and the services, as well as changing priorities necessary to meet mission requirements, the NGB and ORNG is evaluating Alternative 2 without the proposed DMPTR. Under Alternative 2, the DMPTR would not be constructed or operated. Alternative 2 has been identified by the Navy as the Preferred Alternative.

In addition, under Alternative 2, training activities of the types currently conducted would not be increased over levels identified in Alternative 1; however, they would be distributed between existing and proposed ranges. Additional range enhancements include those described in Alternative 1 plus the addition of three mortar pads, a second (western) CLFR, and a new joint-use Range Operations Control Center.

As mentioned above, current fiscal constraints are impacting the DoD and the services, as well as changing priorities necessary to meet mission requirements. With these changing priorities and mission requirements, Alternative 2 meets the selection criteria identified in Section 2.2.1 (Alternatives Development). Alternative 2 would meet Navy and ORNG minimum required capabilities as documented in the Navy Required Capabilities Document of September 8, 2005 and the U.S. Army Forces Command/Army National Guard/U.S. Army Reserve Regulation 350-2, U.S. Army Reserve Regulation 350-1, and Department of the Army Pamphlet 350-8.

ES.10 Affected Environment and Environmental Consequences

The EIS describes existing environmental conditions and assesses the environmental effects of the Proposed Action and alternatives. The affected environment and environmental consequences are described and analyzed according to categories of resources. Due to the concerns regarding wildfire, and the frequency of fires in the region, the potential for wildfire as a result of military activities at NWSTF Boardman is addressed in its own resource category. The categories of resources addressed, and their respective section numbers, in the EIS are listed within Table ES-1.

In the environmental impact analysis process, the resources analyzed are identified and the expected geographic scope of potential impacts for each resource, known as the resource's region of influence, is defined. The discussion and analysis, organized by resource area, mainly coincide with the air and land training areas of NWSTF Boardman.

Table ES-1: Categories of Resources Addressed in the Environmental Impact Statement

Soils (3.1)	Socioeconomics and Environmental Justice (3.8)
Air Quality (3.2)	Transportation (3.9)
Water Quality (3.3)	Cultural Resources (3.10)
Noise (3.4)	American Indian Traditional Resources (3.11)
Vegetation (3.5)	Public Health and Safety and Protection of Children (3.12)
Wildlife (3.6)	Wildfire (3.13)
Land Use and Recreation (3.7)	

The Navy has a comprehensive management program that considers biological resources, cultural resources, environmental compliance, and environmental resource education and interpretation (e.g., Integrated Natural Resources Management Plans, Integrated Cultural Resources Management Plans, etc.), the details of which are presented in each relevant resource section. The basis for Navy environmental resource management at NWSTF Boardman is a holistic, long-term view of human activities in conjunction with air/water quality, cultural resources, land uses, noise ordinances, waste management, or other terrestrial biological resources such as sensitive species and habitats. The Navy is responsible for compliance with applicable federal environmental laws, rules, regulations, policies, and guidelines designed to protect terrestrial, environmental, and cultural resources at NWSTF Boardman, concurrent with the Navy's sustained utilization of NWSTF Boardman for training. Environmental programs at NWSTF Boardman balance the need for environmental protection with the training mission, such that military forces maximize the benefits of NWSTF Boardman training assets while minimizing adverse effects on the environment.

To achieve this balance, the Navy monitors the effects of training activities on environmental resources, using an adaptive management strategy to modify resource management in response to the ongoing influx and evaluation of monitoring and management data (see Section 3.6.3.4.4, Adaptive Management and Monitoring). Through this approach, the Navy's environmental resource managers acquire information to identify potential impacts in a timely manner, thus allowing for ongoing adjustments to training and/or resource management while keeping the training mission on schedule to meet necessary training goals. The monitoring effort is focused not only on the environmental resource itself, such as a protected species, but also on the operational and administrative setting for training activities potentially affecting the resource.

ES.11 SUMMARY OF EFFECTS

Environmental effects that may result from the implementation of the Proposed Action or alternatives are summarized at the end of this summary in Table ES-2. A summary of effects is presented for Wildlife, which was identified within the EIS as having potential significant impacts from the activities described under the action alternatives. Resource categories identified as having less than significant impacts from the activities are not presented in Table ES-2. Analysis of the activities described in the action alternatives and conclusions for all resource categories can be found in Chapter 3 (Introduction).

Table ES-2: Summary of Effects (Presented for Each of the Resource Categories Identified within the Environmental Impact Statement as Having Potential Significant Impacts)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.6 Wildlife	• Widespread short-term minor effects from aircraft overflights in the form of physiological or behavioral responses. • Localized short-term minor effects from non-explosive practice munitions impact in the form of physiological or behavioral responses. • Localized short-term minor effects from small arms noise in the form of physiological or behavioral responses. • Localized short-term minor effects from vehicle and equipment noise in the form of physiological or behavioral responses. • Minor and localized effects from physical strikes. Low probability of incidental mortality. No observable population effects. • Localized short-term minor effects in the form of physiological or behavioral responses from electromagnetic fields or laser use. • Ground disturbance and habitat alteration would result in indirect, long-term minor effects in the form of localized habitat degradation.	• Widespread short-term minor effects from aircraft overflights in the form of physiological or behavioral responses. • Localized short-term minor effects from non-explosive practice munitions impact in the form of physiological or behavioral responses. • Short-term minor effects from small arms noise in the form of physiological or behavioral responses. Effects would be widespread. • Noise from large arms (weapons) use has potential to reduce the fitness of individuals and diminish habitat quality. Potential to cause local population declines in Washington ground squirrels, grasshopper sparrows, western burrowing owls, and long-billed curlews. • Land demolitions have the potential to reduce the fitness of individuals and diminish habitat quality. Potential to cause local population declines in Washington ground squirrels, grasshopper sparrows, western burrowing owls, and long-billed curlews. • Widespread short-term minor effects from vehicle and equipment noise in the form of physiological or behavioral responses. • Minor and localized effects from physical strikes. Low probability of incidental mortality. No observable population effects. • Localized short-term minor effects in the form of physiological or behavioral responses from electromagnetic fields or laser use. • Ground disturbance and habitat alteration would result in indirect, long-term minor effects in the form of localized habitat degradation.	• Widespread short-term minor effects from aircraft overflights in the form of physiological or behavioral responses. • Localized short-term minor effects from non-explosive practice munitions impact in the form of physiological or behavioral responses. • Short-term minor effects from small arms noise in the form of physiological or behavioral responses. Effects would be widespread. • Land demolitions have the potential to reduce the fitness of individuals and diminish habitat quality. Potential to cause local population declines in Washington ground squirrels, grasshopper sparrows, western burrowing owls, and long-billed curlews. • Widespread short-term minor effects from vehicle and equipment noise in the form of physiological or behavioral responses. • Minor and localized effects from physical strikes. Low probability of incidental mortality. No observable population effects. • Localized short-term minor effects in the form of physiological or behavioral responses from electromagnetic fields or laser use. • Ground disturbance and habitat alteration would result in indirect, long-term minor effects in the form of localized habitat degradation.

Table ES-2: Summary of Effects (Presented for Each of the Resource Categories Identified within the Environmental Impact Statement as Having Potential Significant Impacts) (continued)

Resource	No Action Alternative	Alternative 1	Alternative 2
3.6 Wildlife (continued)	• ***Impact Conclusion:*** The No Action Alternative would not result in significant impacts on wildlife.	• ***Impact Conclusion:*** Alternative 1 would result in significant impacts on wildlife because local declines in the Washington ground squirrel population could occur. Mitigation measures would be implemented to reduce impacts to this species.	• ***Impact Conclusion:*** Alternative 2 would result in significant impacts on wildlife because local declines in the Washington ground squirrel population could occur. Mitigation measures would be implemented to reduce impacts to this species.
	Mitigation: The analysis presented in this section indicates that the Preferred Alternative (Alternative 2) would result in unavoidable impacts on historically occupied Washington ground squirrel habitat. Therefore, mitigation measures would be implemented to compensate for these unavoidable impacts from the Preferred Alternative, as described in the Final Conferencing Opinion with USFWS (Appendix B, Regulatory Correspondence). The mitigation goal is no net loss of habitat quantity or quality, and to provide a net benefit of habitat quantity or quality, which would be achieved through in-kind and in-proximity habitat restoration and enhancement. Although not required under ESA, the Navy and ORNG (acting as the National Guard Bureau's agent) engaged in early conferencing with the USFWS to address impacts on the Washington ground squirrel and develop conservation measures to avoid, minimize, and mitigate impacts on this candidate species. Proposed mitigation measures are based on the outcome of the conference process and are provided in the Conference Opinion issued by USFWS on December 2, 2013 (Appendix B, Regulatory Correspondence).		

Notes: MP = Management Practice, ESA = Endangered Species Act, INRMP = Integrated Natural Resources Management Plan, NAS = Naval Air Station, Navy = U.S. Department of the Navy, NWSTF = Naval Weapons Systems Training Facility, ORNG = Oregon National Guard, USFWS = U.S. Fish and Wildlife Services

ES.12 Cumulative Impacts

Cumulative impacts were analyzed by following the NEPA of 1969, CEQ regulations, and CEQ guidance (40 C.F.R. §§1500–1508). Identifiable impacts of actions occurring in the past and present were analyzed, along with reasonably foreseeable future actions, to assess additive impacts of the Proposed Action, as well as other activities occurring in the region, including activities contributing to air quality emissions and loss of habitat.. When considered with other actions, the incremental contribution of the No Action Alternative, Alternative 1, or Alternative 2 to cumulative impacts on soils, air quality, water quality, noise, vegetation, wildlife, land use and recreation, socioeconomics and environmental justice, transportation, cultural resources, American Indian traditional resources, public health and safety, and wildfire would not rise to the level of significance. The No Action Alternative, Alternative 1, or Alternative 2 would also make incremental contributions to overall greenhouse gas emissions, but the incremental contributions would not be considered significant.

ES.13 Mitigation Measures

As part of the Navy and ORNG commitment to sustainable use of resources and environmental stewardship, the Navy and ORNG incorporate measures that are protective of the environment into all of their activities. These include employment of management practices (MPs), standard operating procedures, adoption of conservation recommendations, and other measures that mitigate the impacts of training activities on the environment. Some of these measures are generally applicable and others are designed to apply to certain geographic areas during certain times of year, for specific types of military training.

NEPA regulations require that the federal agency evaluate means to mitigate adverse environmental impacts of the Proposed Action or alternatives (40 C.F.R. §1502.16). Additionally, an EIS is to include study of appropriate mitigation measures not already included in the alternatives (40 C.F.R. §1502.14[f]). Each of the alternatives considered in this EIS includes proposed MPs and mitigation measures intended to reduce the environmental effects of Navy and ORNG activities. Both MPs and mitigation measures are discussed throughout the EIS in connection with affected resources, and are addressed in Chapter 5 (Mitigation Measures).

ES.14 Other Required Considerations

ES.14.1 Possible Conflicts with Objectives of Federal, State, and Local Plans, Policies, and Controls

Implementation of the Proposed Action for the NWTSF Boardman EIS is not expected to conflict with the objectives or requirements of federal, state, regional, or local plans, policies, or legal requirements. The Navy and ORNG have consulted or conferenced with regulatory agencies as appropriate during the NEPA process and prior to implementation of the Proposed Action to ensure requirements are met. Table 6-1 provides a summary of environmental compliance requirements that may apply. Agency correspondence can be found in Appendix B and supporting documentation can be found on the NWSTF Boardman EIS website at www.nwstfboardmaneis.com.

ES.14.2 Relationship between Short-Term Uses and Long-Term Productivity

The majority of activities addressed in this EIS would be categorized as long term. For example, although the use of training areas for individual training activities may be of short duration, the training areas would continue to be utilized at the increased rate for the foreseeable future. As the Proposed Action includes an increase in training tempo (Table 2-1), areas designated for training would accommodate a higher level of training uses in the long term, which would, in turn, affect the long-term productivity of environmental resources in those areas. Planning and accommodation of future training tempo requirements and deployment schedules will allow the Navy and ORNG to more readily facilitate long-term resource management strategies while achieving the near-term goal of providing the capacity and capabilities to fully support required training tasks and meet the Title 10 and Title 32 mandates.

ES.14.3 Irreversible or Irretrievable Commitment of Resources

Range development activities associated with the Proposed Action at NWSTF Boardman would result in the irretrievable commitment of nonrenewable energy resources, primarily in the form of fossil fuels (including fuel oil), natural gas, and gasoline for construction equipment. Implementation of the Proposed Action would require fuels used by aircraft and ground-based vehicles. Since fixed- and rotary-wing flights could increase the same under both Alternative 1 and 2 (approximately 91 percent; Table 2-4), total fuel use would increase. Fuel use by ground-based vehicles involved in training activities would also increase. Therefore, total fuel consumption would increase and this nonrenewable resource would be considered irreversibly lost.

ES.14.4 Energy Requirements and Conservation Potential

Increased training activities under Alternative 1 and 2 at NWSTF Boardman would result in an increase in energy demand over the No Action Alternative. Although the required electricity demands would be met by the existing electrical infrastructure at NWSTF Boardman, energy requirements would be subject to any established energy conservation practices. The use of energy sources would be minimized wherever possible without compromising safety, training, or testing operations.

ES.14.5 Natural or Depletable Resource Requirements and Conservation Potential

Resources that will be permanently and continually consumed by the Proposed Action include water, soils, electricity, natural gas, and fossil fuels. To the extent practicable, pollution prevention considerations are included. In addition, sustainable range management practices are in place that protect and conserve natural and cultural resources while preserving access to training areas for current and future training requirements.

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µm	micrometer(s)
µg/L	micrometer(s) per liter
ac.	acre(s)
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ADNL	A weighted Day-Night Sound Level
A-G BOMBEX	Air-to-Ground Bombing Exercise
A-G GUNEX	Air-to-Ground Gunnery Exercise
A-G MISSILEX	Air-to-Ground Missile Exercise
AGL	Above Ground Level
APE	Area of Potential Effect
APZ	Accident Potential Zone
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
B2H	Boardman to Hemingway
BB	bitterbush
BCA	Boardman Conservation Area
BCC	Bird of conservation concern
BCR 9-OR/WA	Portion of Bird Conservation Region 9 located in Oregon/Washington
BG	Bunchgrass
BLM	Bureau of Land Management
BNOISE2	Blast Noise Prediction Model
BP	Before Present
C	Candidate
CAA	Clean Air Act
cal	caliber
CDNL	C-weighted Day-Night Sound Level
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
CH_4	methane
CLFR	Convoy Live Fire Range
cm	centimeter(s)
CNEL	Community Noise Equivalent Level
CNRNW	Commander, Navy Region Northwest
CO	carbon monoxide
CO_2	carbon dioxide
COMNAVREGNW	Commander Navy Region Northwest
CRE	Comprehensive Range Evaluation
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
dB	decibels
dBA	A-weighted decibels
dBC	C-weighted decibels
dBP	peak, unweighted decibels
DMPTR	Digital Multi-Purpose Training Range
DNL	Day-Night Sound Level
DoD	Department of Defense
DTR	Demolition Training Range
E	Endangered
EFSC	Energy Facility Siting Council
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Right-to-Know Act
EPR	Engine Power Ratio
ESA	Endangered Species Act
ESHP	Equivalent Shaft Horsepower
ETR	Engine Thrust Request
F&ES	Fire and Emergency Services
FAA	Federal Aviation Administration
FL	Flight Level
FNWA	Federal Noxious Weed Act
FPPA	Farmland Protection Policy Act
FR	Federal Register
ft.	foot/feet
$ft.^2$	square foot/feet
g	gram(s)
gal.	gallon(s)
GE	General Electric
GF	Annual Grass/forb
GIS	Geographic Information System
GSA	General Services Administration
ha	hectare(s)
HARM	High-Speed Anti-Radiation Missile
HMMWV	High Mobility Multipurpose Wheeled Vehicles
HMX	High Melting Explosive (octahydro-1,3,5,7-tetranitro-1,3,5,6-tetreaocine)
Hz	Hertz
ICRMP	Integrated Cultural Resources Management Plan
IEEE	Institute of Electrical and Electronics Engineers
IFR	Instrument Flight Rules
in.	inch(es)
INRMP	Integrated Natural Resources Management Plan
JU	juniper tree
kg	kilogram(s)
KIAS	Modeled Average Speed
km	kilometer(s)
km^2	square kilometer(s)
kph	kilometer(s) per hour

kV	kilovolt(s)
LATT	Low Altitude Tactical Training
L	liter(s)
lb.	pound(s)
L_{dnmr}	A-weighted day-night average sound level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Unweighted Sound Level
LRA	Local Redevelopment Authority
LS	open, low shrub
LZ	Landing Zones
m	meter(s)
m^2	square meter(s)
mg/kg	milligram(s) per kilogram
mi.	mile(s)
mm	millimeter(s)
MMR	Military Munitions Rule
MOA	Military Operations Area
MP	Management Practice
mph	miles per hour
MPMGR	Multi-Purpose Machine Gun Range
MR_NMAP	MOA-Range NOISEMAP
MSCCAA	Multi-Species Candidate Conservation Agreement with Assurances
MSL	Mean Sea Level
MTR	Military Training Route
MW	megawatt(s)
n/a	not applicable
N_2O	nitrous oxide
NA	Number-of-Events At or Above a Selected Noise Threshold
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
NATOPS	Naval Air Training and Operating Procedures Standardization
Navy	U.S. Department of the Navy
NC	Engine Core RPM
NE	northeast
NEPA	National Environmental Policy Act
NEW	Net Explosive Weight
NFPA	National Fire Protection Association
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
nm^2	square nautical mile(s)
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NOI	Notice of Intent
NOTAM	Notice to Airmen
NRHP	National Register of Historic Places
NSA	National Security Area
NWSTF	Naval Weapons Systems Training Facility
O_3	ozone
OBIC	Oregon Biodiversity Information Center
ODFW	Oregon Department of Fish and Wildlife
OMD	Oregon Military Department
ORAP	Operational Range Assessment Program
ORC	Operational Range Clearance
ORNG	Oregon National Guard
ORS	Oregon Revised Statutes
OPNAVINST	Chief of Naval Operations Instruction
oz.	ounce(s)
Pb	lead
PGE	Portland General Electric
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter ≤ 2.5 µm diameter
PM_{10}	Particulate Matter ≤ 10 µm diameter
PO	pond
RA	Restricted Area
RAICUZ	Range Air Installation Compatible Use Zone
RCA	Range Condition Assessment
RCRA	Resource Conservation and Recovery Act
RDT&E	Research, Development, Test, and Evaluation
RNA	Research Natural Area
ROI	Region of Influence
RPM	Revolutions Per Minute
RSEPA	Range Sustainability Environmental Program Assessment
SB	sagebrush
SCR	sensitive-critical
SDZ	Surface Danger Zone
SEAT	Single-Engine Air Tanker
SECNAVINST	Secretary of the Navy Instruction
SEL	Sound Exposure Level
SEL_r	Onset-Rate Adjusted Sound Exposure Level
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SO_x	sulfur oxide
SOC	species of concern
SOH	Safety and Occupational Health
SOP	Standard Operating Procedure
ST	Human Structure
SUA	Special Use Airspace
SUAS	Small Unmanned Aircraft Systems
SV	Sensitive Vulnerable
Tg	teragram(s)
Tg CO_2 Eq.	teragrams of carbon dioxide equivalent
TNT	trinitrotoluene
TOW	Optically Tracked, Wire-Guided Missile
TUAS	Tactical Unmanned Aircraft Systems
UA	Unmanned Aircraft
UAS	Unmanned Aircraft Systems
UAV	Unmanned Aircraft Vehicle
UCD	Umatilla Chemical Depot

UEC	Umatilla Electric Cooperative
U.S.	United States
USA	United States of America
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
V/m	Volts per meter
VFR	Visual Flight Rules
VOC	Volatile Organic Compound
VOR	Very High Frequency Omnidirectional Range
VR	Visual Flight Route Military Training Routes
WDZ	Weapons Danger Zone
WGS	Washington ground squirrel

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GLOSSARY

Term	Definition
Crawl, Walk, Run	A training approach that focuses on the basics before moving onto more advanced techniques.
Crew-served Weapon	A crew-served weapon is any weapon system that requires a crew of more than one individual to function at optimum efficiency due to its operational complexity, such as requiring one person to load while another fires. The weight and bulk of the system often also necessitates multiple personnel for transportation.
Large Arms	For purposes of this Environmental Impact Statement (EIS), these are weapons that are larger than .50 caliber. Examples include 120 millimeter (mm) tank cannon rounds.
Live fire	The act of engaging a weapon such that a projectile is forcibly ejected from that weapon. The projectiles used at Naval Weapons Systems Training Facility (NWSTF) Boardman are non-explosive. Live fire is different from dry fire in that during a dry fire activity, the weapon is engaged, but no projectile is ejected.
Low-Altitude Tactical Training (LATT)	Simulates combat conditions, where aircraft will operate at altitudes as low as 200 feet (ft.) (61 meters [m]) above ground level and at high airspeed (in excess of 250 knots [287.7 miles per hour]) to defeat simulated ground missile radars and avoid sophisticated surface-to-air missiles, anti-aircraft artillery, and enemy fighters.
Micrositing	The analysis of local resources to determine the exact location of a building or structure within a project site to maximize usability and minimize potential impacts.
Military Operations Area (MOA)	A MOA is airspace designated outside of Class A airspace (the airspace from flight level [FL] 180 or 18,000 ft. [5,486 m] to FL 600 or 60,000 ft. [18,288 m]), to separate or segregate certain nonhazardous military activities from Instrument Flight Rules traffic and to identify for Visual Flight Rules traffic where these activities are conducted. MOAs are designated to contain nonhazardous, military flight activities including, but not limited to, air combat maneuvers, air intercepts, low altitude tactics, etc. Aircraft utilizing the MOA are not engaged in any firing or bombing activities.
Military Readiness Activity	Readiness activities are defined as all training activities and military operations related to combat and the testing of equipment for combat use.
Mitigation	Methods or techniques that can directly reduce a potential adverse impact through avoidance, minimization, rectification, reduction, or compensation.
Paradropping	Delivery of supplies or equipment to a ground location by parachute.
Restricted Area (RA)	An RA is airspace established under 14 Code of Federal Regulations (C.F.R.) Part 73 provisions, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Restricted areas are established when determined necessary to confine or segregate activities. An RA denotes an area where unusual, often dangerous, hazards to aircraft such as weapons firing, aerial gunnery, or Unmanned Aircraft System (UAS) activities occur.

Range Operations and Control Area (ROCA)	The ROCA is the center for overall control and operation of an individual training range and the training exercises conducted there, and includes administrative services and support facilities. From the ROCA, down-range target and simulation equipment are operated and activities are monitored for scoring and performance data review.
Small Arms	For purposes of this EIS, these are weapons that are .50 caliber and below. Examples of small arms include 5.56 mm to 40 mm rounds.
Special Use Airspace (SUA)	SUA is airspace of defined dimensions wherein activities must be confined because of their nature, or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. The types of SUA are Prohibited Areas, Restricted Areas, MOA, Warning Areas, Alert Areas, Controlled Firing Areas, and National Security Areas.
Spotting Charge	A spotting charge is designed to explode on impact, showing where a practice ordnance hit. A spotting charge can vary from a few grains of black powder to several pounds of high explosives. At NWSTF Boardman, the spotting charges used are less than 3 grams of explosives (roughly equivalent to a 12 gauge shotgun shell).
Standard Operating Procedure (SOP)	Established procedure to be followed in carrying out a given operation or in a given situation to provide for the safety of personnel and equipment, as well as the success of the training and testing activities.
Surface Danger Zone (SDZ)	The mathematically predicted, three-dimensional area that a projectile or fragment could travel through and impact the earth, either by direct fire or ricochet from surface delivered ordnance.
Unmanned Aircraft System (UAS)	UAS refers to an unmanned aircraft (UA) (also known as a “drone”), payload, and all direct support equipment. Direct support equipment includes the ground control station, ground data terminal, launch and recovery system, transport and logistics vehicles, operators and maintainers, unit leadership, and others. The UA is a machine which functions either by the remote control of a navigator, pilot or autonomously, as a self-directing entity.
Weapon Danger Zone (WDZ)	The ground and airspace for lateral and vertical containment of projectiles, fragments, debris, and components resulting from the firing, launching, and/or detonation of aviation delivered ordnance.
Wildfire	An unplanned, unwanted, wildland fire. Wildfires include unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.
Wildland Fire	Any non-structure fire that occurs in the wildland. Three distinct types of wildland fire have been defined and include wildfire, wildland fire use, and prescribed fire.

1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The National Environmental Policy Act (NEPA) of 1969 (42 United States [U.S.] Code [U.S.C.] §4321 *et seq.*) is the basic charter for environmental planning within the United States. It requires federal decision makers to inform themselves of the environmental consequences of proposed actions that may significantly affect the environment and to consider those consequences in determining courses of action. NEPA requires a high degree of public involvement in the decision-making process. An Environmental Impact Statement (EIS) is a public document that provides a detailed assessment of the potential effects that a major federal action may have on the natural and physical environment. The U.S. Department of the Navy (Navy) prepared this Final EIS (hereafter referred to as "EIS") to assess the potential environmental effects associated with ongoing and proposed Navy and Oregon National Guard (ORNG, which is comprised of the Oregon Army and Air National Guards) training activities (described in detail in Chapter 2, Description of Proposed Action and Alternatives) within the Naval Weapons Systems Training Facility (NWSTF) Boardman (Figure 1-1) and associated airspace. The Navy is the lead agency for this EIS pursuant to 40 Code of Federal Regulations (C.F.R.) §1501.5 and §1508.5. The National Guard Bureau (NGB) and Federal Aviation Administration (FAA) are cooperating agencies pursuant to 40 C.F.R. §1501.6. The Commander, U.S. Pacific Fleet signed a Memorandum of Agreement with the NGB and the ORNG to establish the lead-cooperating agency relationship (August 9, 2010). The ORNG is the NGB's agent for execution of this Memorandum of Agreement. The NGB is the federal instrument responsible for the administration of the National Guard of the United States established by the U.S. Congress as a joint bureau of the Department of the Army and the Department of the Air Force. Since the proposed action contemplates activities associated with special use airspace (SUA), the Navy requested FAA's participation as a cooperating agency (January 10, 2012, Appendix B) in accordance with the guidelines described in the Memorandum of Understanding between the FAA and the Department of Defense (DoD) concerning SUA Environmental Actions, dated October 4, 2005. Congress has charged the FAA with administering all navigable airspace in the public interest as necessary to ensure the safety of aircraft and the efficient use of such airspace. The FAA is the agency with jurisdiction by law and special expertise to those portions of the NWSTF Boardman proposal regarding establishment of new airspace.

This EIS was prepared in compliance with NEPA (42 U.S.C. §4321 *et seq.*), Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 C.F.R. Parts 1500-1508), Navy Procedures for Implementing NEPA (32 C.F.R. Part 775), Environmental Analysis of Army Actions (32 C.F.R. Part 651), which also covers Army National Guard activities, and FAA Orders 1050.1 (Environmental Impacts: Policies and Procedures) and JO7400.2 (Procedures for Handling Airspace Matters).

The Navy's mission is to organize, train, and equip combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. This mission is mandated by federal law (Title 10 U.S.C. §5062), which ensures the readiness of the United States' naval forces.[1] The Navy executes this responsibility by establishing and executing training programs, and ensuring naval forces have access to the ranges, operating areas, and airspace needed to develop and maintain skills for conducting naval activities.

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[1] Title 10, §5062 of the U.S.C. provides: "The Navy shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It is responsible for the preparation of naval forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war."

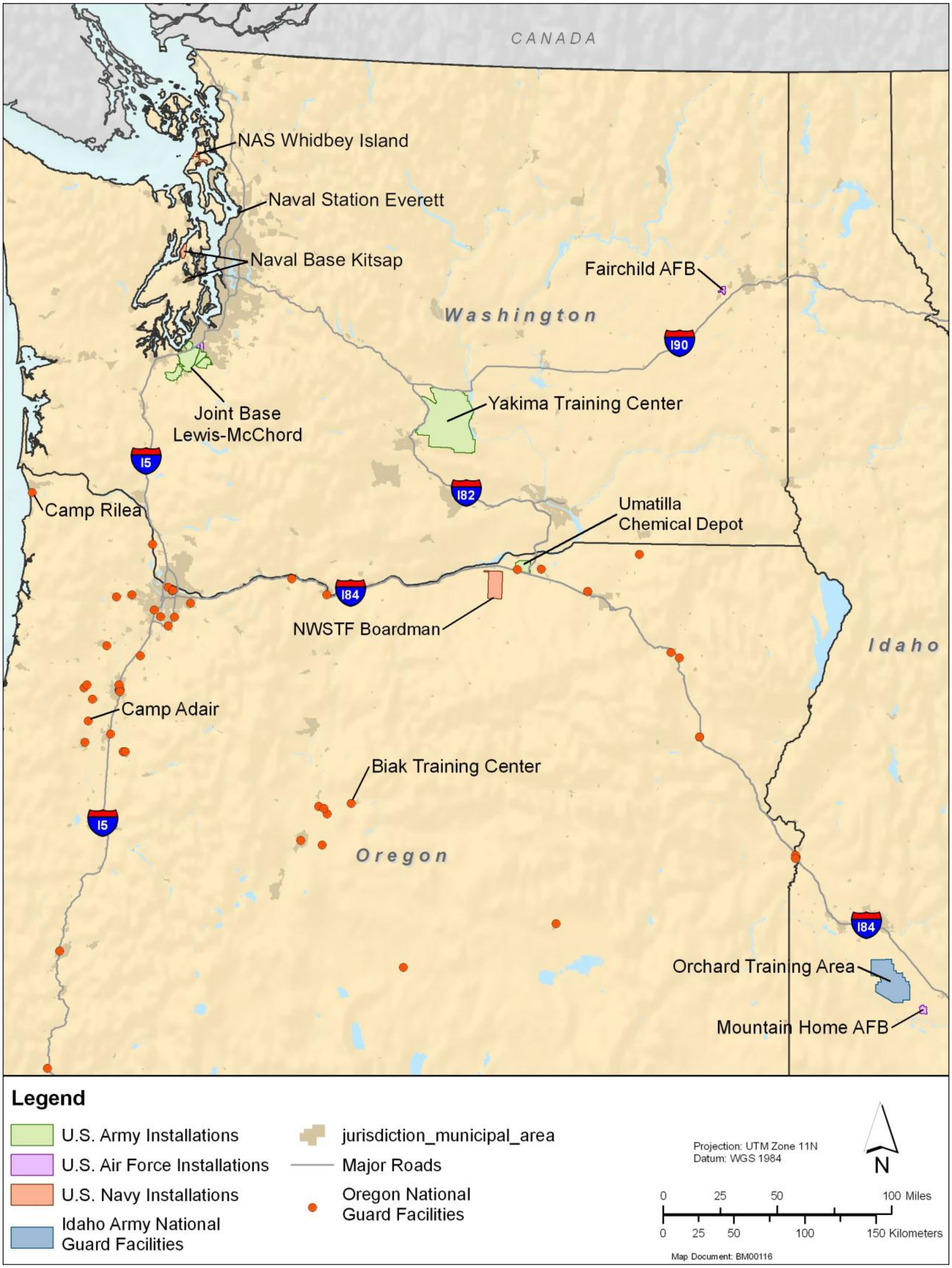


Figure 1-1: NWSTF Boardman and Surrounding Bases

The ORNG has a dual state and federal mission to “provide the citizens of the State of Oregon and the United States with a ready force of citizen Soldiers and Airmen, equipped and trained to respond to any contingency” (Oregon National Guard 2012). A key component of the nation’s defense, the National Guard’s federal mission is “to provide trained units and qualified persons available for active duty in the armed forces, in time of war or national emergency, and at such other times as the national security may require, to fill the needs of the armed forces whenever more units and persons are needed than are available in the regular components” (Army, Navy, Marine Corps, or Air Force) (Title 10 U.S.C. §10102). The ORNG is also an asset to the State of Oregon during emergencies caused by natural disasters, civil disturbances, acts of terrorism, and other threats to life, property, or civil order. As the State’s Commander in Chief, the Governor of Oregon may order the ORNG to duty in order to fulfill State mission requirements.

The mission of the NGB is to participate with the Army and the Air Force staffs in the formulation, development, and coordination of all programs, policies, concepts, and plans pertaining to or affecting the National Guard (which includes the Army National Guard and the Air National Guard of the United States). The NGB develops and administers such detailed operating and funding programs as are required for the operation of the Army National Guard and the Air National Guard, based on approved programs, policies, and guidance from the U.S. Department of the Army and the U.S Department of the Air Force. The NGB also participates with and assists states in the organization, maintenance, and operation of their National Guard units to provide trained and equipped units capable of immediate expansion to war strength, and make the units available for service in time of war or emergency to augment the active duty Army and Air Force.

NWSTF Boardman and its associated airspace currently play a vital part in the execution of the readiness mandates for the Navy and ORNG. It serves as a regional training range for a variety of military units located in the northwest area and a variety of training activities. These include naval aviation units homeported at Naval Air Station (NAS) Whidbey Island and ORNG units located throughout the state of Oregon. Additionally, NWSTF Boardman and its associated airspace support training and testing of Unmanned Aircraft Systems (UAS) under various DoD activities. The Proposed Action is a step toward ensuring the continued vitality and viability of this essential training resource.

As described in Chapter 2 (Description of Proposed Action and Alternatives), the Proposed Action would result in critical increases in training activities and development of necessary ranges, range facilities, and range infrastructure selectively focused to achieve and maintain a state of military readiness[2] commensurate with the Navy and NGB national defense missions. The Proposed Action does not include changes to or expansion of the existing NWSTF Boardman land boundaries. In summary, the Navy and the ORNG propose to implement actions within NWSTF Boardman to:

- Maintain or modify certain training activities from current levels as necessary to support the Navy’s Fleet Response Training Plan and United States Army Regulation 350-2 (Reserve Component Training)
- Maintain or modify certain research, development, testing, and evaluation activities from current levels as necessary to support the Navy’s Fleet Response Training Plan and United States Army Regulation 350-2 (Reserve Component Training)

[2] For purposes of this EIS, testing and training can also be covered under the term “military readiness activities.”

- Develop and operate additional ranges, range facilities, and range infrastructure to support the Navy and ORNG's training requirements
- Expand the existing FAA-designated SUA and include a new Military Operations Area (MOA)
- Accommodate mission requirements associated with force structure changes and introduction of new weapons and systems for training
- Implement range enhancements on existing ranges

Information contained in this EIS will help Navy and ORNG decision makers determine the scope and level of future military readiness activities at NWSTF Boardman and its associated airspace and assist FAA decision-makers in determining whether to approve additional proposed MOA. To support an informed decision, the EIS identifies objectives and criteria for military (hereafter referred to as "Service[s]") training activities at NWSTF Boardman and its associated airspace. The core of the EIS is the development and analysis of different alternatives for achieving these objectives. Criteria set forth in Chapter 2 (Description of Proposed Action and Alternatives) provide the basis for the statement of the Proposed Action and alternatives and selection of alternatives for further analysis, as well as analyses of the environmental effects of the Proposed Action and alternatives (Chapter 3). Chapter 2 (Description of Proposed Action and Alternatives) also discusses alternatives that were considered but eliminated because they do not satisfy the purpose and need or they fail to meet selection criteria.

1.2 PURPOSE AND NEED

The purpose of the Proposed Action is to achieve and maintain military readiness by using a weapons training facility within acceptable travel distance for ORNG and Navy personnel that has appropriate air to ground ranges, terrestrial impact areas, and SUA to support and conduct current, emerging, and future military readiness activities, while enhancing training resources through investments and development of necessary infrastructure on the range.

A weapons training facility with these capabilities is essential to maintain military readiness because of the unique training environment provided by these assets. Due to shortfalls in range capabilities at NWSTF Boardman and the associated airspace, and within the state of Oregon and in the Pacific Northwest, the Navy and ORNG propose to take actions for the following purposes:

- Ensuring that NWSTF Boardman and its associated airspace continue to support critical military training activities in a realistic and cost-effective manner;
- Achieving and maintaining military readiness using NWSTF Boardman and its associated airspace to support and conduct current, emerging, and future military readiness activities; and
- Upgrading and modernizing the existing capabilities of NWSTF Boardman and its associated airspace to address training range shortfalls in Oregon and the Pacific Northwest.

The Proposed Action is needed to provide a training environment consisting of ranges, training areas, and range instrumentation with the capacity and capabilities to fully support required training tasks for operational units utilizing NWSTF Boardman. In this regard, NWSTF Boardman and its associated airspace further the military's execution of its roles and responsibilities under U.S.C. Title 10 (federal military) and Title 32 (State National Guard). To comply with Title 10 and Title 32 mandates, the military needs to maintain current levels of military readiness through improvement of training capabilities at NWSTF Boardman and within its associated airspace, accommodate increases in training, and maintenance of the long-term viability of NWSTF Boardman and its associated airspace as a military training and testing area.

The Navy and ORNG have developed alternatives selection criteria pursuant to 40 C.F.R. §1502.14, which are discussed in Chapter 2 (Description of Proposed Action and Alternatives), based on this statement of the purpose and need.

1.3 BACKGROUND

1.3.1 HISTORY OF NWSTF BOARDMAN

On January 23, 1941, the President issued Executive Order (EO) 8651, whereby the area now encompassing NWSTF Boardman was withdrawn from public lands to be used for aerial bombing and gunnery ranges by the War Department. Military use of NWSTF Boardman began in 1943 when the U.S. Army Air Corps, and subsequently the U.S. Air Force, used the site (approximately 96,000 acres [ac.] [38,849.9 hectares {ha}]) for aerial bombing and gunnery training until 1958 when the Navy was given permission under a permit arrangement to use the property for aerial bombing practice. The property was formally transferred from the Air Force to the Navy in November 1960. In 1963, the Navy transferred by deed the western half of the property, approximately 48,568 ac. (19,654.8 ha) to the state of Oregon and retained approximately 47,432 ac. (19,195.1 ha). This land component of NWSTF Boardman is a combination of federally withdrawn land (approximately 37,320 ac.) and fee land (approximately 10,112 ac.) with title held by the United States but with management functions held by U.S. Navy, Commander, Navy Region Northwest. The Commander, Navy Region Northwest has delegated the management functions to Commanding Officer, NAS Whidbey Island. As such, NAS Whidbey Island is solely responsible for environmental resource management in those areas (i.e., natural and cultural resources, hazardous waste, air monitoring, etc.).

Until 1996, NWSTF Boardman was used regularly for bombing and gunnery practice by naval aircraft from NAS Whidbey Island. Since Navy ownership, all bombing and gunnery practice has used non-explosive munitions for training purposes and except for occasional Explosive Ordnance Demolition training events, high explosive munitions have not been used by any parties training on NWSTF Boardman. Since the early 1990s, NWSTF Boardman has been used by the Navy, ORNG, and other Services (e.g., Marine Corps, Air Force, and U.S. Air Force Reserve) for a variety of land based and aviation military readiness activities.

1.3.2 THE STRATEGIC IMPORTANCE OF NWSTF BOARDMAN

NWSTF Boardman and its associated airspace serve as the principal air-to-ground regional range for aviation units located at NAS Whidbey Island and is one of the only western U.S. locations for low-altitude tactical training. NWSTF Boardman and its associated airspace are also used for training (including UAS training) by ORNG units located throughout the state of Oregon. NWSTF Boardman and its associated airspace also support occasional training requirements of other DoD units and the SUA is used by DoD offices to conduct UAS testing and training. Accordingly, the strategic vision for NWSTF Boardman and its associated airspace is to support naval and joint operational readiness by providing a realistic, live-training environment with the capability and capacity to support the Services' current, emerging, and future military readiness activities. NWSTF Boardman and its associated airspace have a unique combination of attributes that make it a strategically important training venue for the Services as presented in the sections below.

1.3.2.1 Location

NWSTF Boardman and its associated airspace serve as a regional range for naval units homeported in the Pacific Northwest area, including aviation units homeported at NAS Whidbey Island. NWSTF Boardman is located approximately 225 miles (mi.) (368.3 kilometers [km]) southeast of NAS Whidbey

Island, where aircraft used in readiness activities at NWSTF Boardman are based. NWSTF Boardman is located within an acceptable travel distance from three ORNG battalion headquarters, which ensures that the actual time spent training during a training period is maximized. Paragraph 3-2d of U.S. Army Regulation 350-2 specifies that travel time to and from a training site will not exceed 25 percent of the total training hours planned for a Multiple Unit Training Assembly (for detailed description, please refer to Section 1.3.5.2, Oregon National Guard Training).

The Pacific Northwest region is home to thousands of military families. The military Services strive, and in many cases are required, to track and where possible limit "personnel tempo," meaning the amount of time that military personnel spend deployed away from home (OPNAVINST 3000.13, AR 350-01). Personnel tempo is an important factor in family readiness, morale, and retention. The availability of NWSTF Boardman and its associated airspace as a regional training range is critical to Navy and ORNG efforts in these administrative (or personnel) support functions.

1.3.2.2 Training Supported

NWSTF Boardman and its associated airspace play a vital role in the execution of the military readiness mandate. This training area is the Pacific Northwest's only venue for Basic phase/Unit-level air-to-ground bombing practice for Naval aviation squadrons and is one of the only western U.S. locations for low-altitude tactical training. Additionally, NWSTF Boardman and its associated airspace support ORNG and other Service training requirements, UAS testing and training, and Surface to Air Counter-Tactics Training. Training at NWSTF Boardman and its associated airspace is critical to the preparation of the Services for advanced level training and predeployment certification.

1.3.2.3 Area of Training Space

NWSTF Boardman consists of ground training areas and roadways (Figure 1-2) as well as the only Restricted Area airspace in Oregon available for military training (Figure 1-3). Detailed descriptions of these areas are provided in Section 1.3.4 (Description of NWSTF Boardman Training Areas). The availability of ground training areas support training across a spectrum of terrestrial and airborne military missions, including potential air-to-ground operations. Further, NWSTF Boardman has appropriate terrain to accommodate existing and proposed training ranges, including both relatively flat open terrain as well as varied, rolling terrain. NWSTF Boardman has at least 9,000 undeveloped ac. (3,642.2 ha) available to entirely contain the military-controlled safety danger zones of proposed ranges (see Chapter 2, Description of Proposed Action and Alternatives) as well as the capability to sustain simultaneous operations of multiple ground ranges to maximize training opportunities and training efficiency. For more detail regarding the uniqueness and importance of the NWSTF Boardman training areas, refer to Chapter 2.6.1 (Constructing Range Enhancements and Conducting Training at Locations Other Than NWSTF Boardman).

The existence of SUA co-located and surrounding NWSTF Boardman provides numerous aviation and land-related training opportunities to Navy, ORNG, and other Service's fixed-wing and rotary-wing aircraft and UASs. Currently, UAS training takes place within Restricted Areas because the UAS do not have the see-and-avoid capability that a piloted aircraft has. There are alternate interim procedures that allow UAS to operate in non-Restricted Areas under an exemption from the FAA called a Certificate of Authorization. In addition to facilitating UAS training activities, the existence of Restricted Areas allows for the future development of ground ranges, which require a vertical clearance and must be controlled prior to use.

1.3.3 TRAINING SHORTFALLS OF NWSTF BOARDMAN

NWSTF Boardman and its associated airspace provide strategic training attributes as described above in Section 1.3.2 (The Strategic Importance of NWSTF Boardman). Nevertheless, certain shortfalls at NWSTF Boardman and its associated airspace (and in the State of Oregon and the northwest region as a whole) constrain each of the Service's ability to support training in the region. The Navy has a regional shortfall in various air combat and ground attack training ranges. The ORNG has a state-wide shortfall in Army standard qualification ranges for crew-served weapons (weapons that require more than one Soldier to operate) and larger weapons platforms, which require a larger range to operate and train safely. Correcting these shortfalls at NWSTF Boardman and its associated airspace would meet the minimum acceptable training requirements of the Services that use NWSTF Boardman, its associated airspace, and the surrounding region.

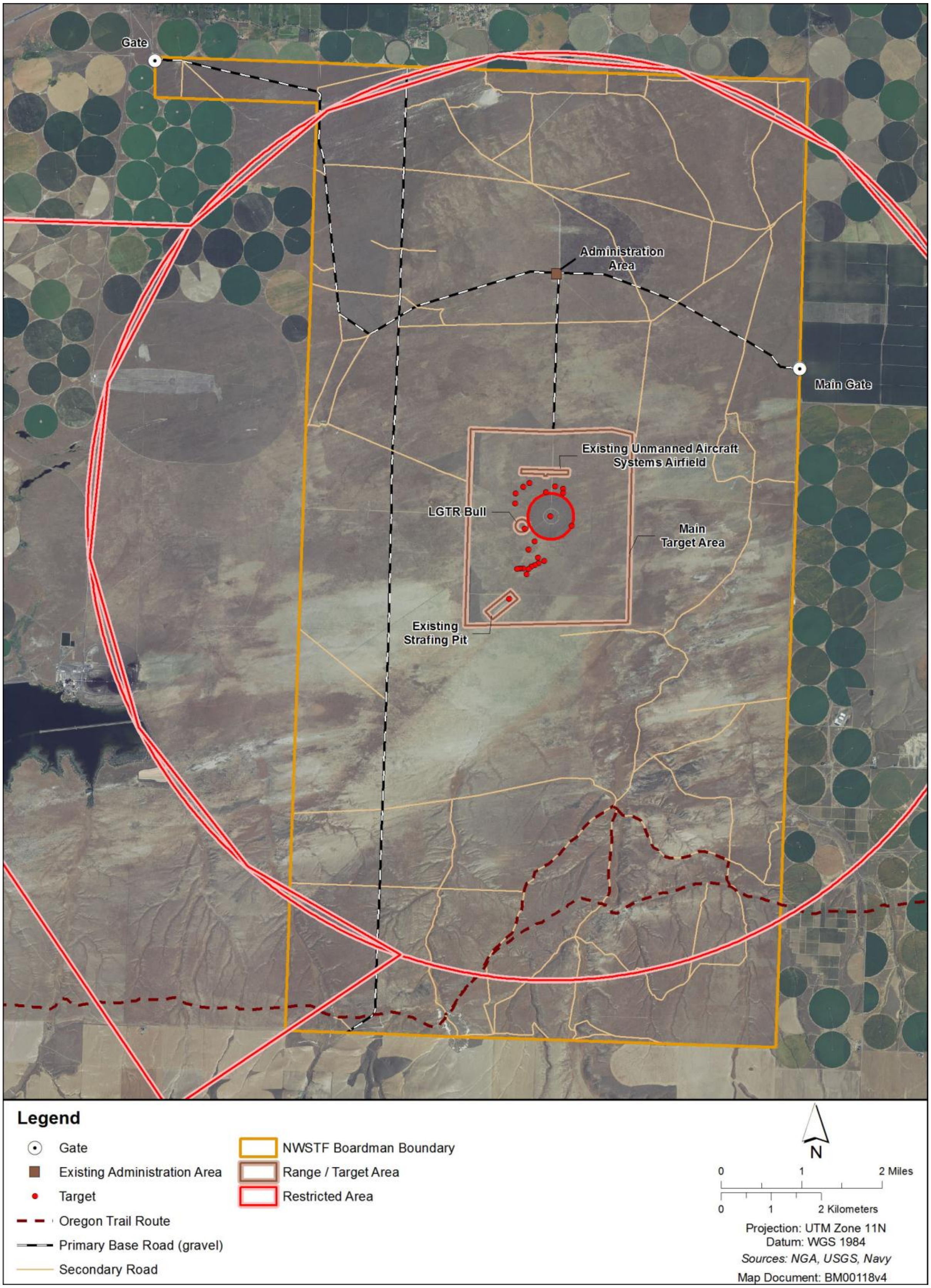
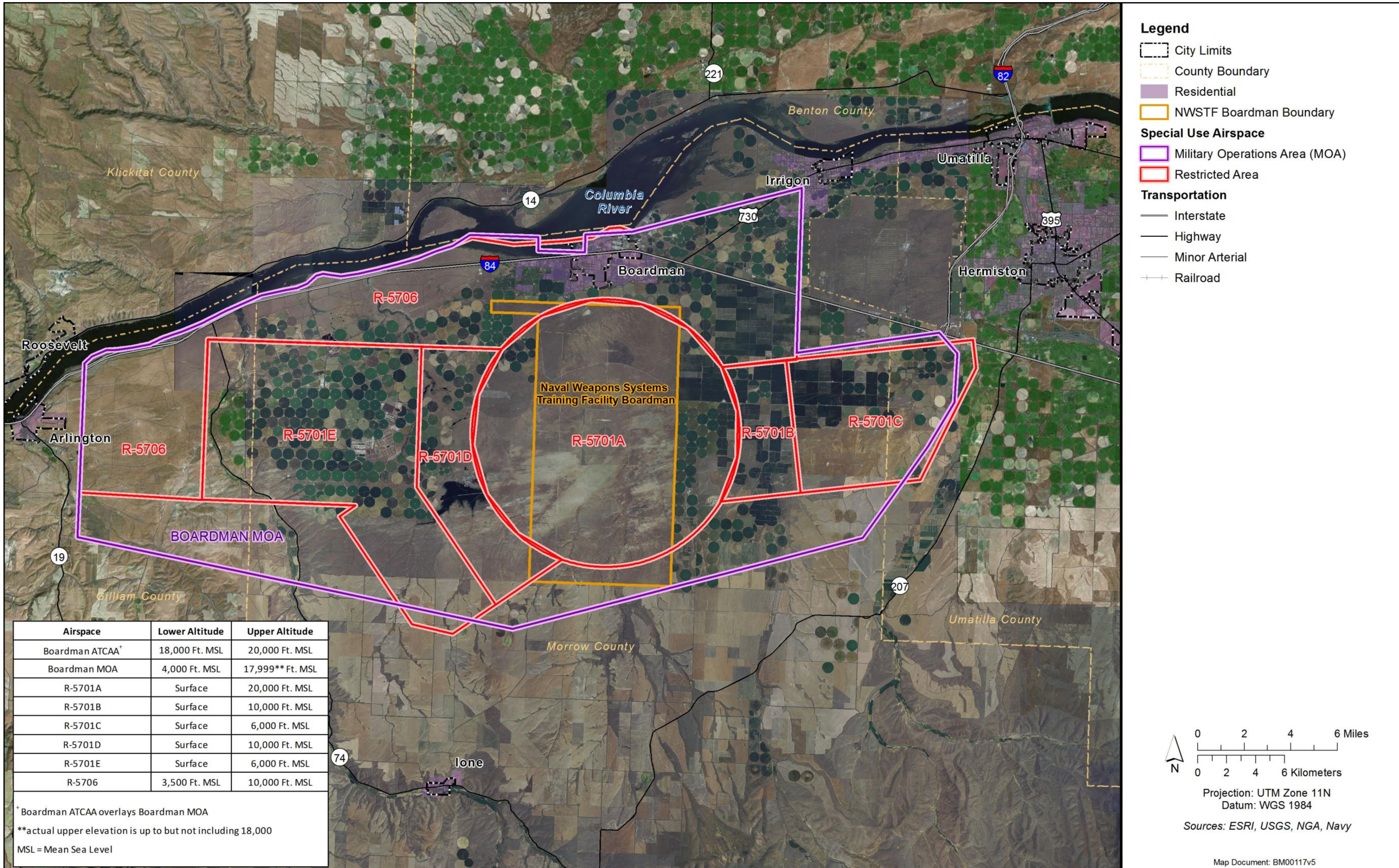


Figure 1-2: Current Training Areas on NWSTF Boardman



Airspace	Lower Altitude	Upper Altitude
Boardman ATCAA*	18,000 Ft. MSL	20,000 Ft. MSL
Boardman MOA	4,000 Ft. MSL	17,999** Ft. MSL
R-5701A	Surface	20,000 Ft. MSL
R-5701B	Surface	10,000 Ft. MSL
R-5701C	Surface	6,000 Ft. MSL
R-5701D	Surface	10,000 Ft. MSL
R-5701E	Surface	6,000 Ft. MSL
R-5706	3,500 Ft. MSL	10,000 Ft. MSL

* Boardman ATCAA overlays Boardman MOA

**actual upper elevation is up to but not including 18,000

MSL = Mean Sea Level

Figure 1-3: Existing NWSTF Boardman Military Operations Area and Restricted Areas

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Weapons training shortfalls for both the Navy and ORNG include an inadequate number and type of effective targets, inadequate "opposition forces" training environments, and insufficient instrumentation or scoring systems for the conduct of Air Warfare, Strike Warfare, and Electronic Warfare training within the Primary Mission Areas of the Navy. ORNG weapons training shortfalls include the lack of Army-standard sniper, machine gun, helicopter door gunnery, and vehicle-mounted, crew-served weapon qualification and training ranges.

Airspace training shortfalls constrain each of the Services' ability to support training in the region. Shortfalls include lack of a modern UAS training and maintenance facility within FAA-designated Restricted Areas, a parachute Drop Zone, and a range to train in coordinating air support by ground elements. The Proposed Action is intended to upgrade and modernize the military training facilities at NWSTF Boardman and its associated airspace to address these deficiencies. The Proposed Action would provide NWSTF Boardman the flexibility to adapt and transform its training environment as new weapons systems are introduced, new threat capabilities emerge, and new technologies offer improved training opportunities.

1.3.4 Description of NWSTF Boardman Training Areas

1.3.4.1 Surrounding Land Use

NWSTF Boardman is located in north-central Oregon, in Morrow County, approximately 2 mi. (3.2 km) south of Boardman, Oregon and the Columbia River and 16 mi. (25.7 km) southwest of Hermiston, Oregon. NWSTF Boardman (Figure 1-3) consists of 47,432 ac. (19,195 ha) of land and 358 square nautical miles (nm^2) of associated SUA. The SUA includes several different airspace designations that are depicted in Figure 1-3 and Figure 1-4, and are explained in greater detail in the following section.

NWSTF Boardman is located approximately 0.5 mi. (0.8 km) south of the Boardman city limits. Interstate 84 runs east-west through the city of Boardman, dividing it roughly one-third to the north and two-thirds to the south of the highway. Within the city limits, land use zoning is a combination of residential, industrial, commercial, open space, and easements, as designated by the City of Boardman. NWSTF Boardman property is located wholly within Morrow County. The land use zoning established by Morrow County immediately surrounding NWSTF Boardman on all sides is Exclusive Farm Use. Land uses to the east, south, and west of NWSTF Boardman are predominantly agricultural production, but also include a Boeing Company test facility, a commercial solid waste landfill, and a Portland General Electric (PGE) electrical generation plant.

In 2004, Threemile Canyon Farms (the "Farm"), a large, privately-owned farm located immediately west of NWSTF Boardman, and PGE, whose Boardman power plant is located approximately 2.8 mi. (4.5 km) west of the Installation and within the Farm's land, agreed to designate 23,430 ac. (9,502 ha) as conservation areas for management by The Nature Conservancy, to protect habitat for several animal species, including the Washington ground squirrel (*Urocitellus washingtoni*). Collectively, the designated conservation areas are known as the Boardman Conservation Area (BCA). The BCA was established under the terms of a Multi-Species Candidate Conservation Agreement with Assurances between the Farm, PGE, the U.S. Fish and Wildlife Service (USFWS), and the Oregon Department of Fish and Wildlife (ODFW). Other areas of the Farm, including the Boeing test facility and the PGE property, may be used and developed. The ODFW holds a permanent conservation easement on the 22,600 ac. (9,146 ha) of the Farm property included in the BCA (Evans and Associates 2004).

Oregon has vast wind energy resources and ranks in the top ten states with the most wind energy generation capacity installed (U.S. Department of Energy 2011). Several wind energy generation projects have been developed in the vicinity of NWSTF Boardman and others are planned. Section 3.7 (Land Use and Recreation) provides additional information on surrounding land uses and wind energy projects in the area.

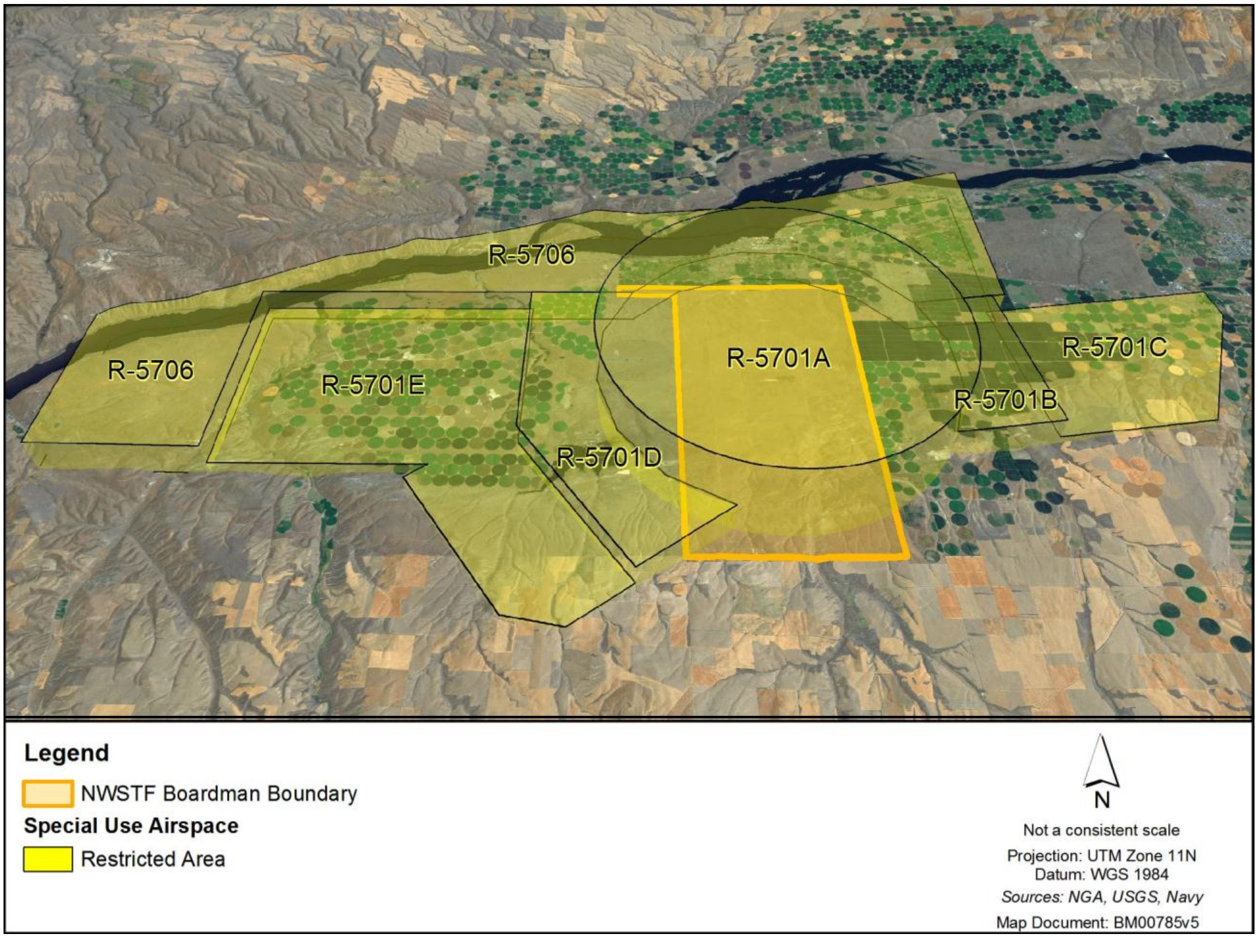

Figure 1-4: NWSTF Boardman Existing Restricted Area

1.3.4.2 Special Use Airspace Training Areas

The airspace over NWSTF Boardman is comprised of two different types of SUA: Restricted Areas (R-5701 [A-E] and R-5706) that overlay portions of the NWSTF Boardman land areas and a MOA (Boardman MOA, OR) that overlies most of the Restricted Areas. Designated by the FAA, Restricted Areas are SUA within which the flight of non-participating aircraft, while not wholly prohibited, is subject to restrictions. Activities taking place in the airspace must be confined due to their nature and the need to adhere to limitations imposed on aircraft activities for which the SUA is designated (FAA JO 7400.8). Non-participating military and civilian aircraft are not allowed into the Restricted Areas without the controlling authority's approval.

According to the 14 C.F.R. §1.1, a MOA is airspace established outside Class A airspace (18,000 to 60,000 feet [ft.] [5,486.4 to 18,288 meters {m}] Mean Sea Level [MSL]) to separate or segregate nonhazardous military activities from Instrument Flight Rules traffic and to identify for Visual Flight Rule (VFR) traffic where these activities are conducted. The designation of a MOA identifies for other users the areas where military activity occurs, provides for segregation of that activity from other fliers, and allows charting to keep airspace users informed. MOAs do not restrict VFR operations; however, pilots operating under VFR should exercise extreme caution while flying within, near, or below an active MOA. The Boardman SUA currently has only one MOA and it provides military aircraft maneuver space for training (Figure 1-3).

The difference between a MOA and a Restricted Area airspace is that, in a MOA, military aviation units may be using the airspace, but they are not engaged in any firing or bombing activities. Restricted Areas denote the existence of unusual, often dangerous, hazards to aircraft such as weapons firing, or aerial gunnery. Table 1-1 provides additional information on NWSTF Boardman's Restricted Areas, which make up the only Restricted Area airspace in the state of Oregon.

Table 1-1: Existing NWSTF Boardman Airspace

Area Designation	Description
Boardman Military Operations Area	Located above north-central Oregon and covers 358 nm^2 in area. This Military Operations Area is available from 4,000 ft. (1,292 m) up to but not including 18,000 ft. (5,486 m) MSL. The scheduling authority is NAS Whidbey Island and Seattle Center is the controlling authority.
Boardman Air Traffic Control Assigned Airspace	Superimposes the Boardman Military Operations Area, covers 358 nm^2 and starts at 18,000 ft. (5,486 m) MSL with an upper limit of FL200 (6,096 m [20,000 ft.]). The scheduling authority is NAS Whidbey Island and Seattle Center is the controlling authority.
R-5701A	A 78 nm^2 circular area over the central portion of Boardman that extends from the surface to 20,000 ft. (6,096 m). The scheduling authority is NAS Whidbey Island and Seattle Center is the controlling authority.
R-5701B	An 11 nm^2 rectangular area immediately east of R-5701A that extends from the surface to 10,000 ft. (3,048 m). The scheduling authority is NAS Whidbey Island and Seattle Center is the controlling authority.
R-5701C	A 31 nm^2 rectangular area immediately east of R-5701B that extends to the east slightly outside the Boardman Military Operations Area boundary. R-5701C extends from the surface to 6,000 ft. (1,829 m). The scheduling authority is NAS Whidbey Island and Seattle Center is the controlling authority.
R-5701D	A 21 nm^2 area south and west of R-5701A that extends from the surface to 10,000 ft. (3,048 m). The scheduling authority is NAS Whidbey Island and Seattle Center is the controlling authority.
R-5701E	A 64 nm^2 area immediately west of R-5701D that extends from the surface to 6,000 ft. (1,829 m). The scheduling authority is NAS Whidbey Island and Seattle Center is the controlling authority.
R-5706	A 107 nm^2 area in the north and western portions of the Boardman Military Operations Area that extends from the 3,500 ft. (1,067 m) to 10,000 ft. (3,048 m). The scheduling authority is NAS Whidbey Island and Seattle Center is the controlling authority.

Notes: nm^2 = square nautical miles; km^2 = square kilometers; ft. = feet; m = meters; NAS = Naval Air Station; MSL = Mean Sea level; FL = Flight Level; R = Restricted Area; Seattle Center = Air Route Traffic Control located in Auburn, WA; FAA = Federal Aviation Administration

Source: FAA JO 7400.8, National Geospatial-Intelligence Agency 2008

1.3.4.3 Training Land

NWSTF Boardman consists of 47,432 ac. (19,195.1 ha) of relatively flat, vegetated landscape. The land area is predominantly rectangular in shape and is approximately 12 mi. by 6 mi. (19.3 km by 9.6 km) as depicted by the orange rectangle in Figure 1-1. Several air-to-ground targets currently exist within the boundaries of NWSTF Boardman and have been in place for many years, although their scoring systems have been removed. There are several structures (administrative building, etc.) that currently exist to support training activities as well as an unimproved UAS airstrip used by the ORNG for UAS operations. The land component of NWSTF Boardman is a combination of federally withdrawn land (approximately 37,320 ac. [15,103 ha]) and fee land (approximately 10,112 ac. [4,092.2 ha]) with title held by the United States but with management functions held by U.S. Navy, Commander, Navy Region Northwest. The Commander, Navy Region Northwest has delegated the management functions to NAS Whidbey Island. As such, NAS Whidbey Island is solely responsible for environmental resource management in those areas (i.e., natural and cultural resources, hazardous waste, air monitoring, etc.).

As part of the natural resource management at NWSTF Boardman and before the designation of the Boardman Conservation Area, three Research Natural Areas (RNAs) were established on NWSTF Boardman in 1978 and are co-managed by The Nature Conservancy under a long-standing Memorandum of Understanding with the Navy (Figure 1-5). The RNAs are part of a federal government system established for research and educational purposes. Natural features are preserved for scientific purposes and natural processes are allowed to dominate. The RNA program was created to (1) preserve examples of all significant natural ecosystems for comparison with those influenced by man, (2) provide educational and research areas for ecological and environmental studies, and (3) preserve gene pools of threatened and endangered plants and animals. The RNAs on NWSTF Boardman were the first established on DoD lands. The Nature Conservancy activities in the RNAs include research and monitoring of the native habitat types and wildlife species, as well as control of noxious weeds.

1.3.5 Why the Military Trains

The mission (or role) of the U.S. military is to ensure the freedom and safety of all Americans, both at home and abroad. Title 10 of the U.S.C. §5062 and §10102 requires the Services to maintain, train, and equip combat-ready forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. Modern warfare, weaponry, and security activities are complex and have brought both unprecedented opportunity and innumerable challenges to the Services. Smart weapons, used properly, are very accurate and actually allow the Services to accomplish their mission with greater precision and far less destruction than in past conflicts. United States military personnel must train regularly with these smart weapons to understand their capabilities, limitations, and operation, and to develop and maintain proficiency in their use. Modern military actions require teamwork between hundreds or thousands of people, and their various equipment, vehicles, ships, and aircraft, all working collectively as a coordinated unit to achieve success. Military training addresses all aspects of the team, from the individual to joint and coalition teamwork. To do this, the Services employ a building block approach to training. Training doctrine and procedures are based on requirements for deployment of forces. Training proceeds on a continuum, from teaching basic and specialized individual military skills, to intermediate skills or small unit training, to advanced, integrated training events, culminating in joint exercises or pre-deployment certification events. This is commonly referred to by the military as the "crawl, walk, run" approach to training.

Training must be as realistic as possible to provide the experience so important to success and survival. The military often employs simulators and synthetic training to provide early skill repetition and enhance teamwork, but live training in a realistic environment is vital to success. This training requires sufficient land, sea, and airspace to maneuver tactically; realistic targets and objectives; simulated opposition that creates a realistic enemy; and instrumentation to objectively monitor events, evaluate proficiency, and refine training to ensure readiness.

Training areas and ranges provide controlled and safe environments that enable military forces to conduct realistic combat-like training as they undergo all phases of the graduated buildup needed for combat-ready deployment. These training areas and ranges provide the space necessary to conduct controlled and safe training scenarios representative of those that the military's men and women would have to face in actual combat.

The training areas are designed to provide the most realistic training in the most relevant environments, replicating to the best extent possible the stresses of warfare. Typically, they also provide instrumentation that captures the performance of tactics and equipment in order to provide the feedback and assessment that are essential for constructive criticism of personnel and equipment. The live fire phase of training facilitates assessment of the operator's or unit's ability to place munitions on target with the required level of precision while under a stressful environment.

1.3.5.1 Navy Training

The Navy's training cycle, the Optimized Fleet Response Plan, ensures that naval forces achieve and maintain the capabilities to carry out the requirements of combatant commanders. The Optimized Fleet Response Training Plan formalizes the traditional Navy building block approach to training in a way that brings the strike groups to the required level of combat readiness earlier in the training cycle, and sustains that readiness longer. Training proceeds on a continuum, advancing through four phases: (1) maintenance, (2) unit-level training, (3) integrated training, and (4) sustainment. The activities that the Navy conducts at NWSTF Boardman and its associated airspace focus on maintaining and improving readiness of individuals at the unit level phase. These activities also allow Navy personnel to build on their experiences training in a joint (multi-Service) environment. Any training that is joint in nature or augments joint training is invaluable, as most conflicts tend to be fought jointly and the ability of the individual Services to work cohesively together while maximizing and exploiting each Service's own unique capabilities often times is the difference between success and failure.

Navy training activities focus on achieving proficiency in each of several functional areas. The functional areas, known as Primary Mission Areas, that are applicable to Navy training activities at NWSTF Boardman and its associated airspace are: Air Warfare, Strike Warfare, and Electronic Warfare. For purposes of analysis, naval training activities data for use in the EIS are organized according to one of these three Primary Mission Areas. In addition, activities data include some research, development, testing, and evaluation events. Summary descriptions of current training activities conducted at NWSTF Boardman and its associated airspace are provided in Chapter 2 (Description of Proposed Action and Alternatives).

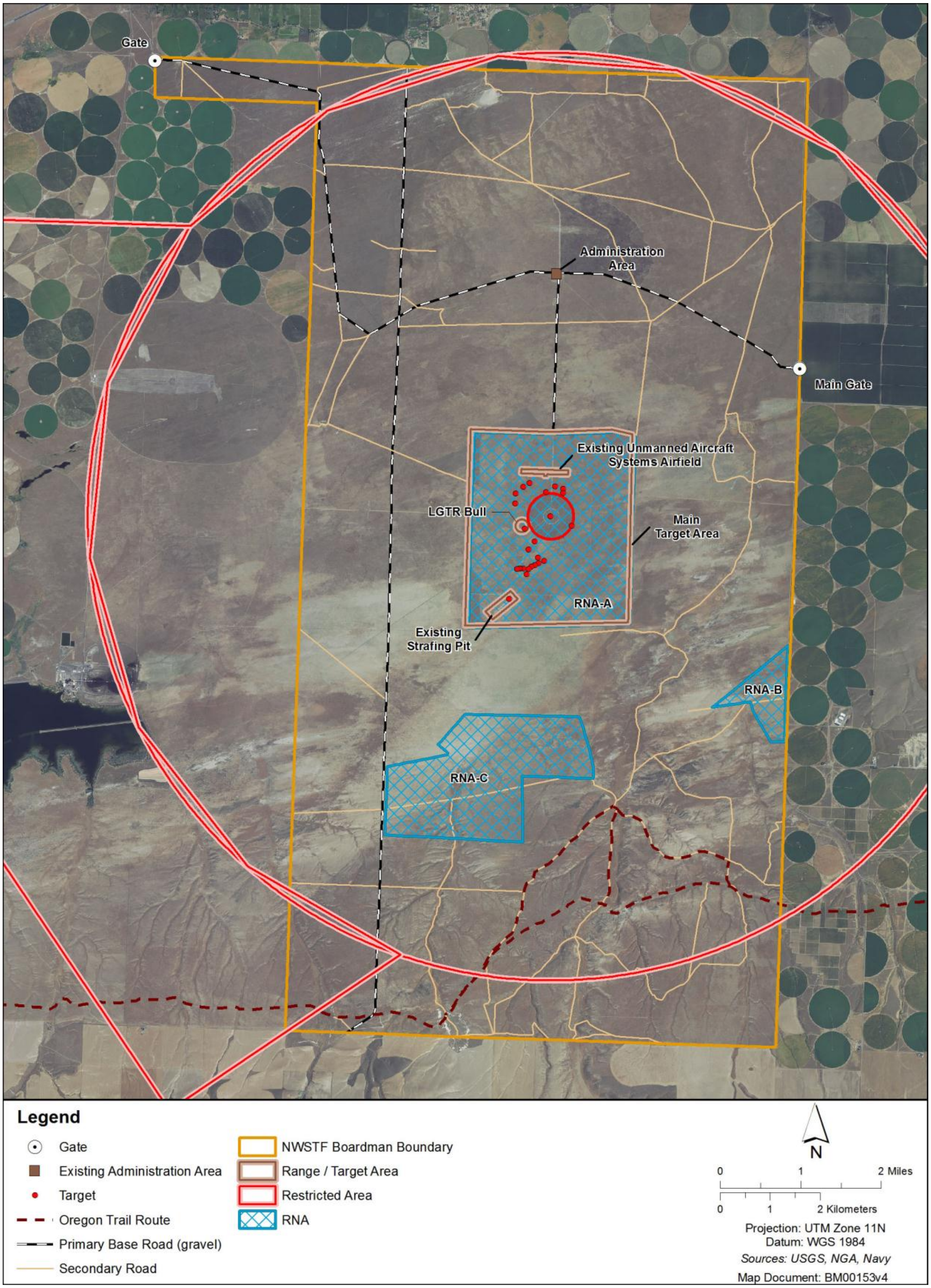

Figure 1-5: NWSTF Boardman Research Natural Areas

1.3.5.2 Oregon National Guard Training

The ORNG is composed of approximately 8,600 members of the Oregon Army and Air National Guards. Oregon Guardsmen are stationed at 43 readiness centers (formerly known as armories) and two air bases located in communities throughout the State. The majority of these Guardsmen belong to the Oregon Army National Guard's two primary force structures: the 82nd Brigade (Troop Command) and the 41st Infantry Brigade Combat Team. The 82nd Brigade includes armored cavalry, aviation, engineer, and support units. The Infantry Brigade Combat Team includes artillery, engineer, infantry, and support units.

The purpose of the Army and Air National Guards established by U.S. Congress (10 U.S.C. §10102) is "to provide trained units and qualified persons available for active duty in the armed forces, in time of war or national emergency, and at such other times as the national security may require, to fill the needs of the armed forces whenever more units and persons are needed than are available in the regular components." When deployed on active duty or when performing training, members of the ORNG are federally-activated components of the Army or Air Force, which is often referred to as "Title 10 Status." Congress has further established in 32 U.S.C. §501(a) that the "discipline, including training, of the Army National Guard shall conform to that of the Army. The discipline, including training, of the Air National Guard shall conform to that of the Air Force." Congress has prescribed in 32 U.S.C. §502(a) that units of the National Guard "assemble for drill and instruction, including indoor target practice, at least 48 times each year" and "participate in training at encampments, maneuvers, outdoor target practice, or other exercises, at least 15 days each year" (this equates to one weekend a month and two weeks annual training). ORNG aviation units (helicopter and UAS) are required to perform additional flight training periods throughout the year to maintain proficiency, enhance flight safety, and increase readiness of aviation personnel. Execution of training is directed toward readiness of individual skills, collective tasks, and support of aviation combat and combat support missions. Generally, these units perform nearly double the number of training days that non-aviation units perform.

Training is a unit's number one priority, and Commanders train their units to be combat ready before deployment. "Battle Focus" is a concept used to derive training requirements, and units train according to their Mission Essential Task Lists. These Mission Essential Task Lists are derived from wartime operational plans (why they fight), unit-specific combat capabilities (how they fight), the operational environment (where they fight), directed missions (what they must do), and any external guidance. The Army trains Soldiers in individual skills, units on collective tasks, and different levels of units through multi-echelon training. The Army trains as it fights, as a combined arms team. Training ranges and training lands are the Army's classroom, and "Commanders take every opportunity to move Soldiers out into the field, to fire weapons, maneuver as a combined arms team, and incorporate protective measures against enemy actions" (Field Manual 7–1, Battle Focused Training).

The Army's core training process has been Army Force Generation. Army Force Generation is a structured progression of Soldier and unit readiness and proficiency between deployments, resulting in recurring periods where trained, ready, and cohesive Army National Guard units are prepared for deployments. Through Army Force Generation, the Army builds the readiness and proficiency of Soldiers and units as they move through three basic stages: Reset, Train-Ready, and Available. During the Reset stage, a unit focuses on reintegrating Soldiers and their families after deployment and completing individual Soldier education and training. The Train-Ready stage focuses on restoring proficiency through individual and collective unit training. In the Available stage, units are prepared to deploy to meet Service requirements. After returning from a deployment mission, a unit returns to the Reset stage.

The Army Force Generation model is consistent with and based on a general “crawl, walk, run” training philosophy, where Soldiers first learn and master fundamental individual and unit skills before progressing to greater proficiency levels through collective training, culminating in battalion-level maneuver training where all levels of combined-arms are integrated and synchronized to execute missions under stressful operational conditions. For example, a Soldier would first learn to safely operate and maintain his or her assigned individual weapon, then qualify individually on a live fire range, then participate in a unit exercise using simulators or blank ammunition, and, finally, progress to a unit exercise using live ammunition.

To be operationally effective, Soldiers must have the skills and experience necessary to operate and maintain their weapons. Live fire training involves both munitions and explosives that would be used in combat and non-explosive training rounds designed to meet Soldiers’ training needs. It is important to note that “live fire” refers to the act of firing a projectile. The projectiles used at NWSTF Boardman are inert. All National Guard Soldiers qualify with their individual weapon (rifle or pistol) at least once annually. Crew-served weapons (machine guns and other automatic weapons requiring two or more Soldiers) qualification varies by type of unit, but is typically required at least once annually. Weapons qualifications are usually accomplished at the company level on Army standard ranges described in Training Circular 25–8. Larger weapons system training and qualification, such as the M2/M3 Bradley Fighting Vehicle, the M1A Abrams Tank, and the Stryker vehicle, consists of a series of “gunnery tables” and occurs on larger range complexes. Where possible, larger weapons systems incorporate inert training rounds (non-explosive) during live fire training and qualifications to lessen potential safety and environmental impacts.

For safety, every range on which live fire exercises are conducted has an associated surface danger zone (SDZ), also called a “range safety fan,” which is active whenever that range is in use. The SDZ is three-dimensional and comprises the entire air and surface area on or through which munitions could possibly traverse or land, taking into account the whole spectrum of ricochet or stray rounds. A weapons training range SDZ must be completely controlled by the military agency, so it can assure the area is clear of any military or civilian personnel, vehicles, or aircraft. Primarily for this reason, the Army cannot construct Army Standard ranges on property that it does not own or control or that is managed for multiple uses, such as public-use Bureau of Land Management land.

Unlike members of the Army and Air Force, most members of the National Guard are not full-time Soldiers or Airmen. Consequently, meeting Army and Air Force training requirements within the limited training time available each year is very important for the National Guard. Army and Air National Guardsman typically train on a regular basis one weekend a month (Inactive Duty Training) and two weeks each year (Annual Training). National Guard training is based on Unit Training Assemblies. A Unit Training Assembly is a minimum four-hour scheduled period, so that an Inactive Duty Training weekend would typically consist of four Unit Training Assemblies. Individual training typically occurs at Army National Guard organizational armories, readiness centers, maintenance shops, and training sites on a regular basis. Collective training of troops in the field during Annual Training occurs at larger training sites. Consequently, non-value added travel time must be kept to a minimum (less than 25 percent according to Army Regulation 350-2 and NGB guidance) to ensure that all training tasks and qualifications can be met annually.

1.3.6 Why the Military Conducts Research, Development, Testing, and Evaluation

The Navy and other Services conduct research, development, testing, and evaluation activities (generally referred to as “testing” in the EIS) to improve warfighting capabilities. Technological advancements in the materials, instrumentation, guidance systems, and tactical capabilities of military platforms and systems continue to evolve in parallel with emerging national security priorities and threat assessments. In response, range requirements and test protocols must also evolve to provide effective program support for such changes. Ranges provide a safe environment for testing system capabilities such as guidance, control, and accuracy in multiple environmental conditions and in surrogate and simulated warfighting environments. To be effective, the range complex must offer the necessary combination of physical characteristics (e.g., sufficient operating area for maneuverability and monitoring, variations in topography, etc.) to satisfy the emerging test and evaluation criteria for each system. For example, UAS testing is currently conducted at NWSTF Boardman and its associated airspace because the Restricted Airspace exists to support this testing.

1.4 The Environmental Review Process

1.4.1 The National Environmental Policy Act

The first step in the NEPA process (pursuant to 40 C.F.R. Parts 1501–1508) is the preparation of a Notice of Intent (NOI) to develop the EIS. The NOI provides an overview of the Proposed Action, the scope of the EIS, and announces public scoping meetings (see Appendix A). The NOI for this project was published in the *Federal Register* on October 5, 2010 (75 Federal Register [FR] 61452), and throughout October 2010 in six local newspapers (*East Oregonian, Tri-City Herald, Oregonian*, *Hermiston Herald, North Morrow Times* and *Heppner Gazette-Times*), which cover Boardman, Pendleton, Hermiston, the Tri-Cities region of southeastern Washington, and the general northeast Oregon region as well as the major metropolitan center of Portland, Oregon. The NOI and newspaper notices included information about comment procedures, the project website address (www.NWSTFBoardmanEIS.com), a list of information repositories (public libraries), and the dates and locations of the scoping meetings.

Scoping is an early and open process for developing the "scope" of issues to be addressed in the EIS, and for identifying significant issues related to a Proposed Action. The scoping meetings for this EIS (held in Boardman, Oregon and Hermiston, Oregon) were advertised in local newspapers. The advertisements invited public attendance to help define and prioritize environmental issues and how to address these issues in the EIS (see Appendix G for information on the scoping process). Comments from the public, as well as from agencies and public interest groups (such as the State Historic Preservation Officer [SHPO] and other non-governmental organizations), including comments regarding the development of alternatives, have been considered in the preparation of this EIS. Additionally, during preparation of this Final EIS, the Navy and ORNG met and discussed with the USFWS, ODFW, and SHPO (see Appendix G for further detail) the proposed action and potential issues to be analyzed in the EIS. Public comments received during the scoping process are categorized and summarized in Table 1-2 and Table 1-3. This summary is not intended to provide a complete listing, but to show the extent of the scope of comments (see Appendix G for more detail).

Table 1-2: Public Scoping Comment Summary

Category	Discussion Topic/Summary of Concern
Economic Impacts	• Concern that preventing wind/renewable energy projects would eliminate the potential for tax revenue, and also impede economic prosperity through the creation of jobs. • Concern that additional restrictions on airspace would result in economic impacts on farming and ranching operations. • Concern that preventing wind/renewable energy projects also would deprive private landowners of potential income.
Airspace/Land Use	• Concern that changes to the Restricted Area Airspace or requirements for military flight corridors free of wind turbines outside NWSTF Boardman airspace would ultimately restrict the construction of wind projects on the property of landowners.
Wind/Renewable Energy Projects	• Concern that changes in airspace would prohibit current wind and renewable energy projects from moving forward, particularly on the south side of NWSTF Boardman and associated airspace.
Biological Resources	• Concern regarding significant, irreversible, adverse effects on native plant and animal species, especially the Washington ground squirrel. • Concern regarding an increase in the incidence of wildland fire, the introduction of exotic plants, and the effects on biological resources due to noise, air emissions, and water pollution.
Policy/NEPA Compliance and Public Participation	• Concern about stakeholder understanding of role or definition of Cooperating Agency under NEPA. • Request for more outreach or information dissemination to local residents/public throughout the NEPA process (e.g., more open houses, more long-term outreach).

Notes: NEPA = National Environmental Policy Act, NWSTF = Naval Weapons Systems Training Facility

Table 1-3: Categorization of Public Scoping Comments by Resource Area

Resource Issues	Comments[1]
Economic Impacts	49
Land Use	49
Airspace	45
Wind/Renewable Energy Projects	42
Public Outreach/Involvement	10
Biological Resources	9
Threatened and Endangered Species and Species of Concern	9
Cumulative Impacts	8
Mitigation	7
Fire Management	7
Airborne Sound	6
Energy/Transmission Lines	6
Public Health and Safety	5
Alternative Development	5
Purpose and Need	5
Water Quality	4
Hazardous Waste/Materials	4
Air Quality	4
Policy/ National Environmental Policy Act	4
Miscellaneous	3
Cultural Resources	2
Environmental Justice	2
Transportation	2
COMMENT TOTALS	**287**

[1] Comment totals do not reflect total number of comments from individuals, as some comment responses contained comments on more than one resource area.

A separate and additional scoping effort was conducted by the Navy and the ORNG to address the potential addition of a MOA to join the current airspace to the northeast of existing NWSTF Boardman Airspace. The additional NOI for this addition was published in the *Federal Register* on December 27, 2011 (76 FR 80910), and throughout December 2011 and January 2012 in six local newspapers (*East Oregonian, Tri-City Herald, Oregonian*, *Hermiston Herald, North Morrow Times,* and *Heppner Gazette-Times*), which cover Boardman, Pendleton, Hermiston, and the general northeast Oregon region as well as the major metropolitan center of Portland, Oregon. Similar to the original scoping effort, the NOI and newspaper notices included information about the project additions, a list of information repositories (public libraries), and the project website address, (http://www.NWSTFBoardmanEIS.com). The advertisements invited public comment to help define and prioritize environmental issues and how to address these issues in the EIS. Comments from the public, as well as from agencies and public interest groups (such as SHPO and other non-governmental organizations), have been considered in the preparation of this EIS. At the request of public commentators, the Navy also extended the public comment period for the revised NOI, which was published in the *Federal Register* on February 2, 2012 (77 FR 5242).

Public comments received during the separate and additional scoping process are categorized and summarized in Table 1-4 and Table 1-5. This summary is not intended to provide a complete listing, but to show the extent of the scope of comments (see Appendix G for more detail).

Table 1-4: Additional Public Scoping Comment Summary

Category	Discussion Topic/Summary of Concern
Airspace	• Concern that changes to the airspace will reduce the availability of the airspace to both commercial and private aviators. • Concern that additional changes and restrictions to the airspace will increase the difficulty, which local aviators have in scheduling flight time through Restricted Areas.
Economic Impacts	• Concern that the presence of the installation eliminates the potential for tax revenue, and also impedes agricultural development of the area. • Concern that additional restrictions on airspace would result in economic impacts on farming and ranching operations.
Land Use/Wind/Renewable Airspace	• Concern that the proposed special use airspace would change the feasibility of any route alternatives currently under consideration for energy transmission projects. • Concern that changes to the Restricted Area or requirements for military flight corridors free of wind turbines outside NWSTF Boardman airspace would ultimately restrict the construction of wind projects on the property of landowners.

Note: NWSTF = Naval Weapons Systems Training Facility

Table 1-5: Categorization of Additional Public Scoping Comments by Resource Area

Resource Issues	Comments[1]
Airspace	10
Miscellaneous	3
Economic Impacts	2
Land Use	1
Wind/Renewable Energy Projects	1
Public Outreach/Involvement	1
Alternative Development	1
Water Quality	1
Hazardous Waste/Materials	1
Cultural Resources	1
COMMENT TOTALS	**22**

[1]Comment totals do not reflect total number of comments from individuals, as some comment responses contained comments on more than one resource area

Subsequent to the scoping process, the Draft EIS was prepared to assess the potential effects of the Proposed Action and Alternatives on the environment. A Notice of Availability for the Draft EIS was published in the Federal Register on September 7, 2012 (77 FR 55213) and notices were placed in the aforementioned newspapers announcing the availability of the Draft EIS. The Draft EIS was available for general public and agency review and was circulated for review and comment between September 7 and November 6, 2012. An amended Notice of Availability was published on November 9, 2012 (77 FR 67362) which extended the public comment period to December 6, 2012. A Notice of Public Meetings was published in the Federal Register on September 7, 2012 (77 FR 55195) and meetings were held on September 25, 2012 in Hermiston, OR, and September 26, 2012 in Boardman, OR, to receive public comments on the Draft EIS. A total of 34 comments were received during the public comment period from September 7, 2012 through December 6, 2012, which includes the 30-day comment period extension (2 written comments and 1 oral comment submitted at the public meetings, 11 comments submitted through the project website, 20 written comments submitted via mail). Refer to Appendix G for more information on the public notification process and the public meetings, the Navy's response to all public comments on the Draft EIS, and transcripts of the public meetings.

In this Final EIS, the Navy has made changes to the Draft EIS based on comments received during the public comment period. These changes included factual corrections, additions to existing information, and improvements or modifications to the analyses in the Draft EIS.

A Record of Decision will be signed by the Navy following the issuance of this Final EIS and a 30-day wait/review period. A *Notice of Availability of Record of Decision* will be published in the *Federal Register*, and the Record of Decision will be distributed to agencies and interested parties, and posted on the NWSTF Boardman EIS website. The Record of Decision will also be announced in local newspapers.

1.4.2 Government-to-Government Consultations

As part of the NEPA process and in accordance with EO 13175, Consultation and Coordination with Indian Tribal Governments, the Navy has invited Government-to-Government consultations with the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of Warm Springs Reservation of Oregon, and the Nez Perce Tribe of Idaho. The Navy and ORNG have held staff-level meetings with the Umatilla and Yakama tribes to discuss potential concerns involving the proposed action and alternatives. The Confederated Tribes of the Umatilla Indian Reservation accepted the invitation for Government-to-Government consultation, and conducted consultations to identify historic properties of religious and cultural significance eligible for listing on the National Register of Historic Places within the Areas of Potential Effect at NWSTF Boardman. The consultations culminated in a Memorandum of Agreement, signed in October 2015, to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the National Historic Preservation Act.

1.4.3 Endangered Species Act

The Endangered Species Act (ESA) of 1973 established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend (16 U.S.C. §35 *et seq.*). An "endangered" species is a species that is in danger of extinction throughout all or a significant portion of its range, while a "threatened" species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. The USFWS and the National Marine Fisheries Service (NMFS) jointly administer the ESA and are also responsible for the listing of species (designating a species as either threatened or endangered).[3] The ESA allows the designation of geographic areas as critical habitat for threatened or endangered species.

The ESA provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The law requires federal agencies, in consultation with the USFWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification

[3] None of the wildlife or plant species found at NWSTF Boardman are currently listed or proposed for listing under the ESA.

of designated critical habitat of such species. Under Section 9, the ESA prohibits the take of endangered or threatened species within the United States. Under Section 7 of the ESA, “jeopardize” means to engage in any action that would be expected to reduce appreciably the likelihood of survival and recovery of a listed species by reducing its reproduction, numbers, or distribution.

Regulations implementing the ESA require identification of those actions that “may affect” a listed species or adversely modify critical habitat and consultation with USFWS. Consultation is complete once USFWS prepares a final Biological Opinion or issues a letter of concurrence.

None of the wildlife or plant species found at NWSTF Boardman are currently listed or proposed for listing under ESA. However, the Washington ground squirrel has been designated as a candidate species by the USFWS. Candidate species are plants and animals for which the USFWS has sufficient information to propose them as endangered or threatened under ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA. As such, consultation under Section 7 of the ESA is not required (16 U.S.C. §1536). USFWS encourages cooperative conservation efforts for candidate species because they may warrant future protection under the ESA.

Federal agencies are required to “conference” with USFWS on proposed species pursuant to 50 C.F.R. §407.10. However, there is no required procedure for dealing with candidate species since they receive no protection under the ESA. Under 15 C.F.R. §402.10, conferencing involves informal discussions on a proposed action with USFWS proposing advisory recommendations on ways to mitigate adverse effects. If the action proponent proposes, conferencing may be handled as if it was “formal consultation” for a listed species (per 15 C.F.R. §402.14) and an opinion (similar to a biological opinion) may be prepared. If the species becomes listed, USFWS may adopt the opinion to become the biological opinion and any incidental take statement contained within it may only then become effective to the federal action proponent. Since the Washington ground squirrel is a candidate species that is afforded no protection currently under federal ESA law, the Navy is not under a regulatory requirement to conference or consult with USFWS regarding the species. However, conferencing with USFWS for the Washington ground squirrel has been deemed appropriate for the NWSTF Boardman EIS process as the range property is considered by USFWS to be a prominent habitat area in this region for the species. Therefore, the Navy proposed to conference with USFWS regarding the Washington Ground Squirrel (April 12, 2012).

The Washington ground squirrel was listed as a state-endangered species in 2000 under the Oregon ESA. NWSTF Boardman is federal property under exclusive federal legislative jurisdiction. As such, none of the activities included in the Proposed Action are affected by the Oregon ESA. Nevertheless, the Navy and the ORNG, acting as the NGB’s agent, have included the ODFW in discussions with the USFWS concerning potential effects to the squirrel and mitigation actions.

The Navy submitted a Conferencing Package addressing potential effects to the squirrel and mitigation actions to the USFWS in March 2013, and, following discussions with USFWS, a revised Conferencing Package was submitted to the USFWS in May 2013. The Navy received a Conferencing Opinion from the USFWS in December 2013, which stated that the impacts associated with the proposed military readiness activities at NWTSF Boardman are likely to adversely affect the Washington ground squirrel. However, after reviewing the current status of Washington ground squirrel, the environmental baseline for the action area, the effects of the proposed project activities, and anticipated cumulative effects, it is the Service’s conference opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Washington ground squirrel. The additional information regarding the Washington ground squirrel, potential impacts from proposed actions, as well as mitigation measures as a result of the conferencing process have been incorporated into respective sections in this Final EIS (Wildlife, Mitigation, etc.).

1.4.4 Other Environmental Requirements Considered

The Navy must comply with a variety of other federal environmental laws, regulations, and EOs, which are detailed in their respective resource sections in this EIS. These include (among other applicable laws and regulations):

- Migratory Bird Treaty Act (16 U.S.C. §§703-711)
- Rivers and Harbors Act (33 U.S.C. §§401-426)
- Clean Air Act (42 U.S.C. §§7401-7671)
- Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. §§1251-1387)
- Resource Conservation and Recovery Act (42 U.S.C. §6901 *et seq.*)
- Sikes Act (16 U.S.C. §670 *et seq.*)
- Bald and Golden Eagle Protection Act (16 U.S.C. §668-668c)
- National Historic Preservation Act (54 U.S.C. §3001010)
- Archeological Resources Protection Act (16 U.S.C. §470aa-mm)
- Native American Graves Protection and Repatriation Act (25 U.S.C. §3001)
- Emergency Planning and Community Right-to-Know Act (Superfund Amendments and Reauthorization Act Title III)
- Federal Noxious Weed Act (7 U.S.C. §§2801-2814)
- Soil Conservation Act
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7269 [16 February 1994])
- EO 13045, Environmental Health and Safety Risks to Children (62 FR 19885 [23 April 1997])
- EO 13175, Consultation and Coordination with Indian Tribal Governments
- EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management
- EO 13112, Invasive Species
- EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance
- The *American Indian and Alaska Native Policy*, as annotated October 27, 1999 and administered by the Department of Defense by Department of Defense Instruction 4710.02
- Navy Region Northwest Regional Instruction 11010.4, "Policy for Consultation with Federally Recognized American Indian and Alaskan Native Tribes," dated November 10, 2009
- Federal Wildland Fire Policy of 1995, as amended 2001, and administered by the Departments of the Interior and Agriculture

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2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 OVERVIEW

The Proposed Action involves construction and operation of new range facilities and changes in existing training and testing activities at Naval Weapons Systems Training Facility (NWSTF) Boardman (hereafter referred to as NWSTF Boardman). The Proposed Action would result in enhancements to range facilities and range operations as well as increases in training that are necessary to ensure NWSTF Boardman supports military training and readiness objectives. Actions to support current, emerging, and future training activities at NWSTF Boardman are evaluated in this Environmental Impact Statement (EIS). The components of the Proposed Action stem from United States (U.S.) Department of the Navy (Navy) training requirements (Fleet Response Training Plan) and other military training requirements, including Army Regulation 350-1, *Army Training and Leader Development*; U.S. Army Regulation 350-2, *Reserve Component Training*; Department of the Army Pamphlet 350-38, *Standards in Training Commission*; and Oregon National Guard policies. In general, the Proposed Action would:

- Increase the types of training activities and the number of training events conducted at NWSTF Boardman
- Accommodate force structure changes
- Provide enhancements to training facilities and operations at NWSTF Boardman and its associated special use airspace

2.2 PROPOSED ACTION AND ALTERNATIVES

2.2.1 ALTERNATIVES DEVELOPMENT

National Environmental Policy Act (NEPA) implementing regulations provide guidance on the consideration of alternatives in an EIS. These regulations require the decision maker to consider the environmental effects of a proposed action and a range of alternatives to a proposed action (40 Code of Federal Regulations [C.F.R.] §1502.14). The range of alternatives includes reasonable alternatives (including a no action alternative), which must be rigorously and objectively explored, as well as other alternatives that are eliminated from detailed study. Reasonable alternatives include those that are practical or feasible from a technical, temporal and economic standpoint, and support the underlying purpose of and need for the proposed action.

In accordance with Council on Environmental Quality regulations (40 C.F.R. §1502.14[d]), analysis of the No Action Alternative is required. The No Action Alternative provides a baseline against which the effects of the Proposed Action and all other alternatives can be compared. The No Action Alternative analyzed in this EIS involves continuing military training and testing activities at NWSTF Boardman at regular and historic levels. No range enhancements would be made under the No Action Alternative. The potential impacts of the No Action Alternative are compared to the potential impacts of activities proposed under Alternative 1 and Alternative 2 (which has been identified as the Navy's Preferred Alternative).

Alternatives considered in this EIS were developed by the Navy and Oregon National Guard (ORNG) after careful assessment by subject-matter experts, including units and commands that use the ranges, range management professionals, and Navy and National Guard environmental managers and scientists. The team developed criteria to assess whether a possible alternative supports the underlying purpose of and need for the Proposed Action and is practical or feasible from a technical and economic standpoint. Any alternative considered for future analysis must support or employ:

(1) Achievement of training requirements, objectives, and tempo requirements based on Navy, Army, and National Guard readiness requirements (Fleet Response Training Plan, U.S. Army Regulation 350-2, U.S. Army Reserve 350-1, and Department of the Army Pamphlet 350-8);
(2) Sufficient area of special use airspace for training and testing in support of military readiness requirements;
(3) Basic and intermediate training and qualification requirements (including Army qualification range standards [Training Circular 25-8]) of military forces;
(4) Training and Research, Development, Test, and Evaluation (RDT&E) activities associated with authorized Unmanned Aircraft Systems (UASs);
(5) Alignment of installation infrastructure with Navy and National Guard force structures to align with existing and new weapons, systems, and platforms (vehicles, aircraft) as they are assigned to units;
(6) Sustainable range management practices (MPs) that protect and conserve natural and cultural resources to the maximum extent practicable;
(7) Current and future access to training areas for evolving training requirements and minimization of potential encroachments which could adversely affect training capabilities; and
(8) Land that is currently owned by the state of Oregon or the federal government.

Regulations under NEPA require that the federal action proponent study means to mitigate adverse environmental impacts associated with the proposed action or an alternative (40 C.F.R. §1502.16). Additionally, an EIS is to include study of appropriate mitigation measures not already included in the proposed action or alternatives (40 C.F.R. §1502.14 [h]). Each of the alternatives, including the Preferred Alternative (Alternative 2) considered in this EIS, includes mitigation measures intended to reduce the environmental effects of Navy and ORNG activities.

Standard Operating Procedures, MPs, current requirements and practices, as well as mitigation measures are discussed throughout this EIS.

2.2.2 Proposed Action and Alternatives Considered

Three alternatives are analyzed in this EIS: (1) the No Action Alternative – current levels of training and testing activities; (2) Alternative 1 – increase training and testing activities, accommodate force structure changes, and implement required range enhancements; and (3) Alternative 2 – all of Alternative 1 (with the exception of construction and operation of the Digital Multipurpose Training Range [DMPTR]) plus further increase in training and testing activities and implement additional desired range enhancements. The following sections contain the detailed discussion of alternatives carried forward for analysis in the EIS.

2.3 No Action Alternative – Current Training and Testing Activities at Naval Weapons Systems Training Facility Boardman

Each military activity described in this EIS meets a requirement that can be ultimately traced to requirements from the National Command Authority.[1] Over the years, the tempo and types of activities

[1] The National Command Authority is a term used by the U.S. military and government to refer to the ultimate lawful source of military orders. The term refers collectively to the President of the United States (as Commander-in-Chief) and the U.S. Secretary of Defense.

have fluctuated at NWSTF Boardman due to changing requirements, the dynamic nature of international events, the introduction of new equipment, advances in warfighting doctrine and procedures, and force structure changes. Such developments have influenced the frequency, duration, intensity, and location of required training. The factors influencing tempo and types of activities are variable by nature, and will continue to cause fluctuations in training activities on NWSTF Boardman and in its associated airspace. Accordingly, training and testing activity data used throughout this EIS are a representative baseline (based on historical information collected from 2007 to 2010) for evaluating impacts that may result from the proposed training and testing activities, and is presented as the No Action Alternative.

Under the No Action Alternative, the Navy and ORNG would not construct the training facility enhancements or increase the training activities at NWSTF Boardman (Figure 2-1). Training activities at NWSTF Boardman would continue to vary from individual events to unit level events of relatively short duration involving few participants. ORNG Soldiers would continue to be transported long distances to use out-of-state training ranges, dependent on the ability to schedule the use of those ranges, to meet qualification and training requirements, which cannot be met at existing ORNG facilities. The Navy would continue to use the airspace and provide the range operations support. Evaluation of the No Action Alternative in this EIS provides a baseline for assessing environmental impacts of Alternative 1 and Alternative 2, as described in the following subsections.

With reference to criteria in Section 2.2.1 (Alternatives Development), the No Action Alternative supports criteria 6, and 8 while only partially satisfying criteria 1, 2, 3, and 4. The No Action Alternative does not support criteria 5 or 7.

2.3.1 Description of Current Training and Testing Activities at NWSTF Boardman

Descriptions of training and testing activities analyzed in this EIS are organized by the Navy's primary mission areas, regardless of the Service that is conducting the activity. This grouping or bundling of similar activities helps to streamline the analysis of potential impacts and ensures that the overall potential effects of a particular activity are considered, irrespective of the Service conducting the activity. For example, the potential effects of an air-to-ground gunnery exercise conducted by the Navy are expected to be the same as one conducted by the Air National Guard.

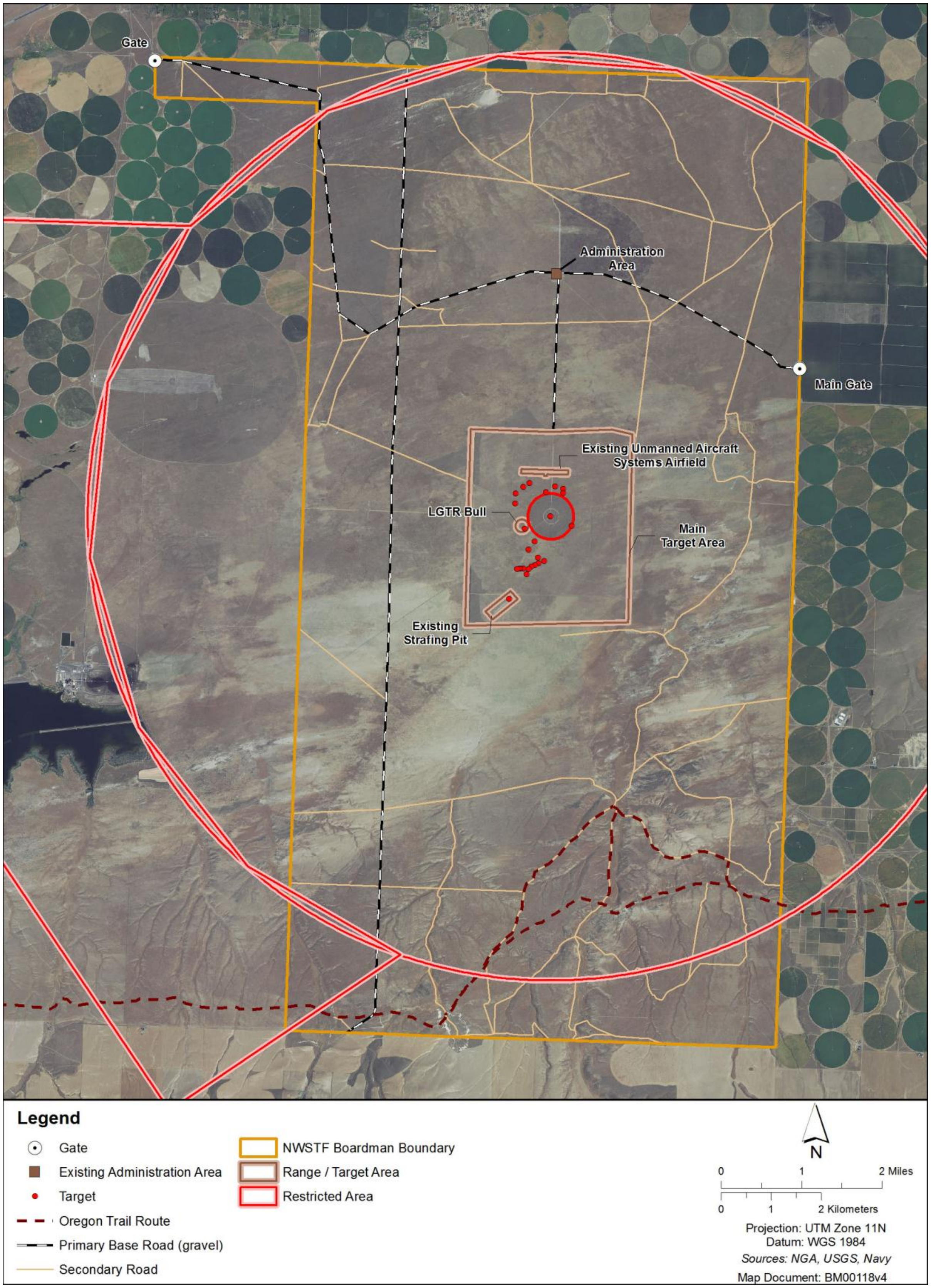

Figure 2-1: Current Training Areas Used on NWSTF Boardman

Separate descriptions are presented when a Services' activity does not align with a Navy primary mission area. This is the case for most of the new ORNG training activities proposed under Alternatives 1 and 2. Current training and testing activities conducted at NWSTF Boardman include the following:

- Air Warfare Training – Low-Altitude Tactical Training (LATT), and Surface-to-Air Counter Tactics
- Electronic Warfare Training – Electronic Attack and Electronic Warfare Support
- Strike Warfare – Air-to-Ground Bombing Exercises, Air-to-Ground Gunnery Exercises, and Air-to-Ground Missile Exercises (captive-carry only, no missiles are fired from the aircraft)
- UAS Operations Training and Testing
- Equipment and Personnel Insertion and Extraction Training
- Helicopter Training Operations (Low-Level Training Flights, Hoisting Operations, Sling-Load Operations, and Austere Landings and Take-Offs)
- Live Fire Range Operations (marksmanship and small arms training) and Dismounted Maneuver Training (Maneuver to Contact Live-fire Training)
- Intelligence, Surveillance, and Reconnaissance Training

Summary descriptions of current training and testing activities conducted at NWSTF Boardman are provided in the following subsections. Table 2-1, located near the end of this chapter, contains summary data for current and proposed training and testing activities at NWSTF Boardman, including platforms used, annual number of training events, and location. Tables 2-2 through 2-4 provide additional information including estimated total annual munitions use at NWSTF Boardman (Table 2-2), estimated annual munitions use by range area (Table 2-3), and aircraft overflights in NWSTF Boardman airspace (Table 2-4). Values in these tables are based on historical use (between 2007 and 2010), existing requirements, and anticipated future requirements. These values are representative of baseline (No Action Alternative) and anticipated future (Alternatives 1 and 2) range use, and are presented for analytical purposes. Actual values will vary based on specific training requirements, which are influenced by factors such as deployments, world events, and non-combat supply events. Descriptions and locations of the NWSTF Boardman training areas and airspace are presented in Section 1.3.3 (Training Shortfalls of NWSTF Boardman), Table 1-1, and Figures 1-2 and 1-3.

For the purposes of this document, aircraft activities will be described by the term "sortie." A sortie is defined as a single entry and exit from the NWSTF Boardman airspace. While the aircraft is within the NWSTF Boardman airspace, it may participate in multiple training events prior to leaving the airspace and concluding the sortie. For example, an aircraft may enter the airspace and perform an Air Combat Maneuver training event and subsequently make two air-to-ground passes dropping a non-explosive practice bomb during each pass before leaving the airspace. While this would only represent one aircraft sortie, there would be a total of three training events.

2.3.1.1 Air Warfare Training

Air Warfare is the primary mission area that addresses combat activities by air and surface forces against hostile aircraft.

2.3.1.1.1 Low-Altitude Tactical Training

LATT is designed to familiarize and maintain aircrew proficiency in the high-speed low altitude flight environment. LATT activities within the NWSTF Boardman airspace are primarily conducted by EA-6B Prowlers and EA-18G Growlers within the Military Operations Area (MOA) and Restricted Areas (see Figures 1-2 and 1-3). Additionally, other Services and other aircraft (e.g., Air Force or Air National Guard

F-15s and F-16s and Marine Corps F/A-18s) conduct LATT activities in NWSTF Boardman airspace, although on a much less frequent basis than the Navy. LATT simulates combat conditions, where aircraft will operate at altitudes as low as 200 feet (ft.) (61 meters [m]) above ground level (AGL) and at high airspeed (in excess of 250 knots [287.7 miles [mi.] per hour]) within Boardman airspace to defeat simulated ground missile radars and avoid sophisticated surface-to-air missiles, anti-aircraft artillery, and enemy fighters (representative flight “swaths” are displayed in Figure 2-2). Training flights spend a majority of time at 500 ft. (152.4 m) AGL or above; however, as described above, flights may be as low as 200 ft. (61 m) AGL for brief times during the training. In order to become proficient in high-speed low altitude flight, pilots must have long hours of realistic training, and then must have many more hours of the same training to remain proficient. LATT involves basic flight maneuvering where aircraft engage in defensive maneuvering under visual or instrument flight rules. Pilots typically avoid airfields, towns, noise-sensitive areas, and wilderness areas at prescribed vertical or horizontal distances (14 C.F.R. §91.119). LATT at NWSTF Boardman considered in this EIS is restricted to the daylight period, and further restricted to being conducted within the timeframe of two hours after sunrise and two hours before sunset for safety purposes.

2.3.1.1.2 Surface-to-Air Counter Tactics

Surface-to-Air Counter Tactics are similar to LATT, in that it is a high-speed training event that trains aircrews to defeat simulated ground missile radars and avoid sophisticated surface-to-air missiles or anti-aircraft artillery. However, Surface-to-Air Counter Tactics can occur at all altitudes. At lower altitudes, terrain is utilized to directly mask the approach of the aircraft. At higher altitudes, Surface-to-Air Counter Tactics typically involves aggressive defensive maneuvering with extensive changes in altitude and direction and the use of countermeasures to defeat tracking radar, surface-to-air missiles, or anti-aircraft artillery.

2.3.1.1.3 Air Combat Maneuvers

Air Combat Maneuvers include Basic Flight Maneuvers where aircraft engage in offensive and defensive maneuvering against each other. During an Air Combat Maneuver engagement, no munitions are fired. While these maneuvers typically involve two aircraft, one aircraft is normally involved at NWSTF Boardman based on airspace size limitations. For this exercise, pilots normally prefer other MOAs with more room for multiple aircraft maneuvers and only use NWSTF Boardman if other areas are not available.

Air Combat Maneuver activities within the NWSTF Boardman airspace are primarily conducted by EA-6B Prowlers and EA-18G Growlers within the MOA and Restricted Areas (Figure 2-2). For this EIS, Air Combat Maneuvers also include other aircraft activities conducted routinely in preparation for more advanced training flights. These other activities include instrument training, basic familiarization training, and formation flying. Additionally, other Services and other aircraft (e.g., Air Force or Air National Guard F-15s and F-16s and Marine Corps FA-18s) conduct Air Combat Maneuver activities in NWSTF Boardman airspace, although on a much less frequent basis than the Navy. Typically, Air Combat Maneuver training events in NWSTF Boardman airspace last about an hour and include EA-18G Growlers and EA-6B Prowlers fixed-wing aircraft flying at altitudes of 200 to 20,000 ft. (61 to 6,096 m) AGL.

2.3.1.2 Electronic Warfare Training

Electronic Warfare is intended to deny the enemy the ability to effectively use electronic equipment to see, communicate, and control the battlespace. To be effective, this type of training needs to be conducted against sea-based, land-based, and airborne threats, or a combination of all three. No munitions are released during Electronic Warfare training. Typical Electronic Warfare activities include signals analysis and use of airborne and surface electronic jamming devices to defeat tracking radar systems. During these activities, aircraft attempt to control critical portions of the electromagnetic spectrum used by threat radars, communications equipment, and electronic detection equipment to degrade or deny the enemy's ability to defend its forces from attack or recognize an emerging threat early enough to take the necessary defensive actions.

Electronic Attack and Electronic Warfare Support are subsets of Electronic Warfare. Electronic Warfare Support provides the capability to intercept, identify, and locate enemy transmitters while Electronic Attack employs tactics, such as electronic jamming, to prevent or reduce the enemy's effective use of electronic equipment and command and control capability. EA-6B Prowler and EA-18G Growler aircraft stationed at Naval Air Station (NAS) Whidbey Island conduct Electronic Warfare Support and Electronic Attack training in the NWSTF Boardman MOA and Restricted Areas. An Electronic Warfare training event in NWSTF Boardman airspace typically lasts from 30 minutes to 1 hour and includes 1–3 fixed-wing aircraft flying at altitudes of 200–20,000 ft. (61–6,096 m) AGL. Land-based mobile electronic signal transmitters located at NWSTF Boardman are used to simulate opposition forces. These signal transmitters consist of specialized electronic equipment mounted on a wheeled trailer. During a training event, the signal transmitter is operated from a stationary position within the existing NWSTF Boardman road network.

The EA-18G Growler is an electronic combat version of the FA-18E/F that is replacing the EA-6B Prowler. The EA-18G Growler has an integrated suite of electronic combat systems that allow it to perform the same Electronic Warfare missions as the EA-6B Prowler (while also having other mission capabilities). In addition to the EA-6B Prowler missions, aircrews of the EA-18G Growler need to train to meet air combat mission requirements (Table 2-1). The advanced capabilities of the EA-18G Growler weapons systems require wider use of the existing training airspace and broader frequency spectrum access than the EA-6B Prowler systems.

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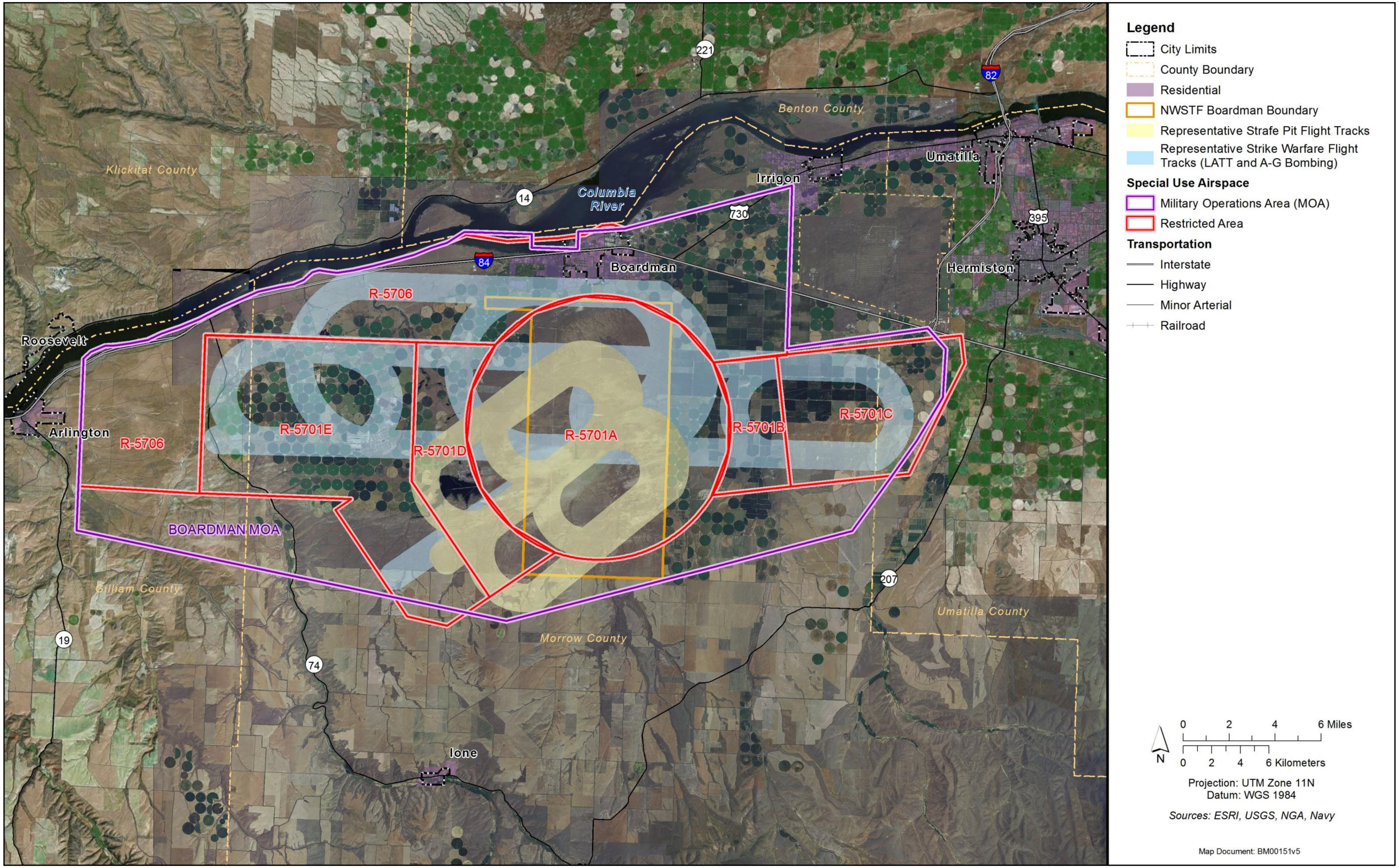

Figure 2-2: Existing Representative Flight Tracks at NWSTF Boardman

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2.3.1.3 Strike Warfare Training

Strike Warfare addresses combat (or interdiction) activities by air and surface forces against hostile land based forces and assets. Three types of Strike Warfare exercises are conducted at NWSTF Boardman and its associated airspace.

2.3.1.3.1 Air-to-Ground Bombing Exercise

Air-to-Ground Bombing Exercises (A-G BOMBEXs) at NWSTF Boardman and its associated airspace involve fixed-wing aircraft that originate from regional land bases such as NAS Whidbey Island. During A-G BOMBEXs, aircraft must identify and attack one of several stationary ground targets located in the main target area (see Figure 2-1). The exercises can be either no-drop or active drops of non-explosive practice bombs or rockets. Non-explosive practice bombs have a signal cartridge or spotting charge (CXU-3 or MK 4) that produces a flash of light and puff of smoke upon impact that permits visual evaluation of accuracy. The non-explosive practice bombs typically used are the 25-pound (lb.) (11.3 kilograms [kg]) MK-76 and heavier MK-80 series practice munitions. Weapons Danger Zones (WDZs) for A-G BOMBEX are depicted in Figure 2-10.

Laser-guided training rounds are also dropped. These training rounds are non-explosive missile-shaped rounds that are released by the attacking aircraft and guided into the target by an “eye-safe” laser that is emitted from the aircraft (this is known as laser spotting). An A-G BOMBEX can also include the use of lasers by ground units to simulate, identify, or mark targets for attack by aircraft. The hazard zone for laser spotting is contained within Navy-administered land on NWSTF Boardman. Standard operating procedures are implemented to protect the public from operational hazards related to laser spotting (Chief of Naval Operations Instruction [OPNAVINST] 5100.27B).

All laser use areas undergo a command review to ensure safety of personnel and the public. Prior to use of a proposed laser area, a certified laser system safety officer surveys the area to ensure compliance with all applicable rules and regulations governing laser use (OPNAVINST 5100.27B). The procedures developed for an area are reviewed annually, and the area is resurveyed every 3 years to ensure the area remains in compliance. Lasers are not used under conditions that would affect the beam, such as in the presence of standing water or snow. Currently, the certification of the range has lapsed, but will be recertified prior to any future use of the range.

2.3.1.3.2 Air-to-Ground Gunnery Exercises

Air-to-Ground Gunnery Exercises (A-G GUNEX) are conducted by rotary- and fixed-wing aircraft against stationary targets located in the main target area (Table 2-1 [located near the end of this chapter], Figure 2-1). Rotary-wing aircraft involved in this activity include ORNG helicopters using 7.62-millimeter (mm) door-mounted machine guns. Fixed-wing aircraft typically conduct strafing runs at a stationary target located in the strafing pit area. The term “strafing run” refers to low-altitude attack of ground targets using an automatic weapon such as a machine gun or cannon. Typical fixed-wing training involves two to four F-15 aircraft using 20 mm guns. Fixed-wing A-G GUNEXs typically last around 45 minutes and consist of two to three dry run practice passes (non-firing) and three to five live-fire passes for each aircraft. Each aircraft descends from above 9,000 ft. (2,743.2 m) AGL to 1,500 ft. (457.2 m) AGL on each pass and expends 200 to 300 rounds per pass of 20 mm practice ammunition. Only one aircraft actually shoots during any one pass. The ORNG typically trains approximately 30 pilots annually in live fire strafing. WDZs for A-G BOMBEX are depicted in Figure 2-10.

2.3.1.3.3 Air-to-Ground Missile Exercise

Suppression of Enemy Air Defense is the primary Air-to-Ground Missile Exercise (A-G MISSILEX) performed at NWSTF Boardman and its associated airspace. The High-speed Anti-Radiation Missile (HARM) is the primary weapon used and is designed to attack emitting radars. Only non-firing HARMs (simulated firing only) are used during Suppression of Enemy Air Defense events in NWSTF Boardman airspace. During a typical High-speed Anti-Radiation Missile Exercise (HARMEX), an EA-6B Prowler or EA-18G Growler flying at a high altitude (>10,000 ft. [3,048 m] AGL) would receive and identify an electronic signal from a simulated enemy radar. The aircrew would then position themselves for the optimum firing solution and simulate firing a HARM missile at the electronic signal. HARMEXs are non-firing events that typically last 30 minutes.

2.3.1.4 Unmanned Aircraft Systems Operations

UAS operations train military personnel to obtain information about the activities of the enemy or tactical area of operations by use of various onboard surveillance systems. The acronym UAS refers to the system as a whole (unmanned aircraft [UA], payload, and all direct support equipment). Direct support equipment includes the ground control station; ground data terminal; launch and recovery system; transport and logistics vehicles; operators and maintainers; unit leadership; and others. The acronym UA refers to the unmanned aircraft exclusively and does not include the payload unless stated otherwise. Numerous types of UASs are currently employed to obtain intelligence data on threats, and several other UAS platforms are in development. The UAS operations are required to be conducted within the Restricted Area (for safety reasons, as UAS do not have see-and-avoid capability that manned aircraft have) at NWSTF Boardman and include testing conducted by various Department of Defense (DoD) offices and training conducted by the Navy and ORNG. During exercises, pilots typically avoid towns, noise-sensitive areas, and wilderness areas at prescribed vertical or horizontal distances. During flights, pilots avoid areas where obstructions to air navigation have been identified. UASs follow the same safety regulations as aircraft (14 C.F.R. §91.119). Additionally, if a UAS loses radio or other contact, it is designed to circle in place until it can reacquire the signal. If it cannot, it is preprogrammed to return to a specific point. Current UAS operations employ various UASs with distinct operating characteristics and capabilities.

Small Unmanned Aircraft Systems (SUAS) are battery powered, lightweight, and portable. SUAS do not require the same level of training to operate, and therefore minimal time to retain proficiency, and are designed for the specific use at a Battalion and/or Company size element. A typical flight period would be 15 minutes upward to 1 hour depending on the complexity and proximity of a mission request and are most often below 500 ft. (152.4 m) AGL. The design and purpose is a rapidly deployable and recoverable reconnaissance platform. Of the varied types of SUAS, the ORNG employs the RQ-11B "Raven." It is remotely operated but requires an assistant/observer during flight. The RQ-11B Raven has a 40-inch (in.) (101.6-centimeter [cm]) wingspan and weighs 4.2 lb. (1.81 kg). It can be transported in a backpack and is designed to land in a manner that separates the major components on touchdown, providing efficient and speedy recovery. Because of its portability and design purpose, the Raven has a small footprint normally consisting of an operator and one assistant or observer. The Navy and DoD offices use the Scan Eagle at NWSTF Boardman and its associated airspace. The Scan Eagle is a runway independent, long-endurance, unmanned aircraft vehicle system designed to provide multiple surveillance, reconnaissance data, and battlefield damage assessment missions.

Tactical Unmanned Aircraft Systems (TUAS) are larger in size than SUAS with greater capabilities. The ORNG employs the RQ-7B "Shadow," which is a rail-launched (nitrogen charged catapult) system (Figure

2-3 shows a Shadow being deployed at another airbase) that can sustain up to 5.5 hours of flight and operates from a few hundred feet AGL to an altitude of 14,000 ft. (4,267.2 m). The Shadow is 12 ft. (3.7 m) in length with a 14 ft. (4.3 m) wingspan and is operated remotely performing day and night operations. Because of the size, complexity, and capability of the Shadow, a larger support group and footprint is required to support mission objectives. A TUAS Platoon currently employs 21 Soldiers, but according to Army proposals, will be expanded to 27 in the near term. This Platoon is resourced with 11 ground vehicles and various shelters for maintenance and operational requirements. A tactical air strip (air field) is essential due to the landing requirements of the TUAS. This strip typically is 1,100 ft. (335.3 m) in length, 50 ft. (15.2 m) in width, with no more than a 2-degree slope horizontally. The employment of the Shadow requires no less than six Soldiers/persons; two operators (one which controls the payload, the other the aircraft); two maintainers who prepare, start, and place the aircraft on the rail as well as recover the aircraft upon landing; a Mission Coordinator; and a Field Service Representative by contract. A tactical air strip exists today just to the north edge of the main target area, within the fence line surrounding the main bull's eye.

Figure 2-3: Unmanned Aircraft System (Shadow)

2.3.1.5 Equipment and Personnel Insertion and Extraction Training

Insertion and extraction activities train military forces to deliver and extract equipment and personnel using a variety of techniques and at a variety of altitudes. These activities encompass parachute, fastrope, rappel, and troop extractions. Fastrope is a technique by which troops descend down a thick rope from an aircraft in places where the aircraft itself is unable or unwilling to touch down. Rappelling is performed on smaller equipment and at a slower rate than fastroping. The C-130 aircraft, HH-53, CH-46, CH-47 and UH-60 helicopters are typically used for equipment and personnel inserts. Insertion and extraction activities at NWSTF Boardman are centered on paradropping (dropping military equipment and supplies attached to parachutes from aircraft). This activity typically lasts anywhere from 30 minutes to 1 hour.

2.3.1.6 Helicopter Training Operations

Helicopter Training Operations include training pilots both day and night in a variety of aviation tasks including low-level flight, hoisting operations that involve lowering a crew member by winch for Search and Rescue training, Sling Load operations that involve the aircraft lifting a heavy load attached to a long-line and suspended beneath the helicopter, and austere landing and take-offs that involve extremely dusty environments. Night Vision Goggle/Night Vision Device Training is done in NWSTF Boardman airspace at low level below 500 ft. (152 m) AGL.

2.3.1.7 Live Fire Range Operations and Dismounted Maneuver Training

Live fire range events include situational or scenario-based training operations that include small arms live fire training up to and including 40 mm grenade launchers. It is important to note that “live fire” refers to the act of firing a projectile. The projectiles used at NWSTF Boardman are practice/training munitions and are inert.

Dismounted Maneuver Training can involve various training scenarios including live fire or dry fire (no projectiles fired) exercises, use of role players, and can involve multiple Military Services. Typically, small units of military personnel move across the landscape on foot undetected conducting reconnaissance missions, coordinating air strikes (simulated or dry fire with real aircraft), or engaging pre-staged targets (live fire).

2.3.1.8 Intelligence, Surveillance, and Reconnaissance

Intelligence refers to the information and knowledge obtained through observation, investigation, analysis, or understanding. Surveillance and reconnaissance refer to the means by which the information is observed. Surveillance is the systematic observation of a targeted area or group, usually over an extended time, while reconnaissance is a specific mission performed to obtain specific data about a target. Intelligence, Surveillance, and Reconnaissance training is conducted by P-3C, EP-3, P-8A, EA-18G Growler, EA-6B Prowler and UAS in NWSTF Boardman’s airspace. Activities typically last approximately an hour. Aircrews use a variety of intelligence gathering and surveillance methods, including visual, infrared, electronic, radar, and acoustic. EP-3, EA-6B Prowler, and EA-18G Growler crews conduct Intelligence, Surveillance, and Reconnaissance training as well, but to a lesser extent than P-3C crews. On occasion, small unit special operations forces, and ground Intelligence, Surveillance, and Reconnaissance activities occur on the NWSTF Boardman range. Examples of Special Forces units that have used the NWSTF Boardman range for ground Intelligence, Surveillance, and Reconnaissance training include Oregon Air National Guard 125th Special Tactics Squadron, U.S. Army Special Forces, U.S. Army Intelligence forces, and Naval Special Warfare Command.

2.3.1.9 Ongoing Maintenance Activities

In addition to training and testing activities currently occurring at NWSTF Boardman, personnel stationed at the facility are tasked with ongoing activities to maintain the usability and safety of the facility:

- Chief of Naval Operations Instruction 3571.4 *Operational Range Clearance Policy for Navy Ranges* (October 9, 2009) establishes the policy and requirements for performing operational range clearance on Navy ranges in accordance with DoD Directive 4715.11.
    - Areas that support various range management activities as well as areas that pose a potential concern to human health or the environment shall undergo clearance activities.
    - To ensure the safety of maintenance personnel, operational range clearance requirements must address ingress/egress routes, run-in lines, maintenance roads, and sufficient area around each target to afford safe movement and operation of personnel and equipment.

  - To ensure all targets resemble the objective of the mission and are distinguishable from its surroundings, all material potentially presenting an explosive hazard located on the surface and partially buried that are greater than 4 in. (10.2 cm) in any dimension, must be removed to an appropriate distance from the target and at an appropriate frequency.
- Current range control procedures at NWSTF Boardman limit access by non-essential personnel, thereby avoiding any unanticipated interference, engagements, or involvement in the range activities. NWSTF Boardman is fully fenced; entrance into these areas is controlled by unmanned gates. Signs also are posted and maintained to warn the public of potentially hazardous activities.
- Vegetation is managed under the *NWSTF Boardman Integrated Natural Resources Management Plan* (U.S. Department of the Navy 2012). Actions focus on minimizing disturbance, controlling invasive plants and weeds, and restoring of native habitats.
- Wildlife species are managed under the *NWSTF Boardman Integrated Natural Resources Management Plan* (U.S. Department of the Navy 2012). Actions focus on minimizing disturbance and restoring native habitats.
- Commander, Navy Region Northwest implements a regional fire management plan (Commander Navy Region Northwest [CNRNW], Fire and Emergency Services 2009). The Navy is currently revising, updating, and expanding the specific portion of that plan applicable to NWSTF Boardman. The current fire strategy is to use the existing road system as the staging lines at which fires will be fought. The Navy currently maintains a system of 60 ft. (18.3 m) wide fire breaks throughout NWSTF Boardman. A detachment of six Navy personnel is stationed at NWSTF Boardman. Their responsibilities are to maintain the buildings, roads, wells, fences, and other infrastructure and provide security.

2.4 Alternative 1 – Increase Training Activities, Accommodate Force Structure Changes, and Implement Required Range Enhancements

2.4.1 Overview

Alternative 1 would include all current training and testing activities described under the No Action Alternative, and would include the establishment and use of additional MOA to the northeast of existing NWSTF Boardman airspace, an increase in existing training and testing activities, new training activities, and range enhancements to meet Navy and ORNG training requirements. Some ongoing training activities would increase as a result of force structure changes associated with the introduction of new aircraft or other equipment.

The following proposed range enhancements would support new training activities and some ongoing activities.

- Establishment of an additional MOA to join existing restricted airspace (Boardman Low MOA). Establishment of an extension to the existing Boardman MOA in the northeast area of Boardman airspace (Boardman MOA, Proposed Extension).
- Construction and operation of a Multipurpose Machine Gun Range (MPMGR), with a heavy sniper lane, and associated support facilities.
- Construction and operation of a DMPTR and associated support facilities.
- Construction and operation of an eastern Convoy Live Fire Range (CLFR).
- Construction and operation of a Demolition Training Range (DTR).

- Construction and operation of a single building housing both the Range Operations Control Center and UAS Training and Maintenance Facility with small airstrip.
- Designation and establishment of a Drop Zone to accommodate parachute operations of personnel and small-medium sized equipment (Containerized Delivery Systems).

With reference to criteria identified in Section 2.2.1 (Alternatives Development), Alternative 1 supports criteria 1, 2, 3, 4, 5, 6, and 8. Alternative 1 partially supports criterion 7.

2.4.2 CHANGES IN TRAINING AND TESTING ACTIVITIES

Table 2-1 contains summary data for current (No Action Alternative) and proposed (Alternatives 1 and 2) training and testing activities at NWSTF Boardman, including platforms used, annual number of estimated training events, and location. Table 2-2 through Table 2-4 provide additional information including estimated maximum total annual munitions use at NWSTF Boardman (Table 2-2), estimated annual munitions use by range area (Table 2-3), and aircraft overflights in NWSTF Boardman airspace (Table 2-4). The information presented in Table 2-1 through Table 2-4 was developed by Navy and ORNG subject matter experts based on historical use (No Action Alternative) and anticipated future use (Alternatives 1 and 2) of NWSTF Boardman and its associated airspace. Specific values presented in the tables are representative annual maximum values that were used in the impact analysis for this EIS. These values were derived from data on past use, current requirements, and anticipated emerging requirements. Specific values for past use have varied based on several factors such as changes in training doctrine, deployment schedules, weapons systems, and world events. Likewise, actual values for future use are expected to vary for the same reasons. Specific platforms, weapons systems, and types of munitions presented in the tables and mentioned throughout the document are also representative for analytical purposes. While this information is comprehensive, similar platforms, weapons systems, and types of munitions with similar characteristics that are not specifically mentioned could be used.

As noted above, the range enhancements proposed under Alternative 1 would support new training activities and some ongoing training activities (Figure 2-4 through Figure 2-7):

- An additional MOA to join existing restricted airspace would be created and would be called the Boardman Low MOA (lower altitude of 500 ft. [152.4 m] AGL and upper altitude of 3,999 ft. [1,218.9 m] Mean Sea Level [MSL]). Also, an extension would be made to the existing Boardman MOA in the northeast area of Boardman airspace (Boardman MOA, Proposed Extension) (Figure 2-5). Low-altitude flight tracks would be oriented along a northeast axis to facilitate the use of these additional MOA (Figure 2-6), avoiding existing wind turbines on the far eastern end of R-5701C.
- The MPMGR would be used to train and qualify Soldiers in the use of various crew-served weapons (those weapons which require more than one individual to operate).
- The DMPTR would be used for dismounted infantry squad tactical live-fire operations as well as to train with larger crew-served, vehicle-mounted weapons, including the M1A1 Abrams Main Battle Tank, the M2 Bradley Infantry Fighting Vehicle, M3 Bradley Cavalry Fighting Vehicle, Stryker vehicle, and High Mobility Multipurpose Wheeled Vehicles. The DMPTR would be also used to perform helicopter door gunnery training using the CH-47.
- The CLFR would be used for training Soldiers in planning and conducting vehicle convoy operations, including immediate action response using weapons live fire against threats encountered during convoy operations utilizing wheeled and tracked vehicles.

- The DTR would be used by Explosive Ordnance Disposal (EOD) personnel, Combat Engineers, and others for land demolition training (i.e., safely detonating explosive charges).
- A Range Operations Control Center and UAS Training and Maintenance Facility, housed in a single building, would support classroom, simulator, and UAS flight training, which is ongoing, but limited due to the lack of adequate facilities. The facility also would be used for range operations functions and to conduct maintenance and repair of the unmanned aircraft and for storage of the UAS platoon's equipment. Additional details about the construction, operation, and maintenance of the range enhancements are provided in Section 2.4.4 (Required Range Enhancements).

NWSTF Boardman is required to accommodate and support Navy, ORNG, and DoD training with new aircraft and weapons/sensor systems as they become operational. In addition, NWSTF Boardman is required to support flight operations and training with UAS, as they are developed. Several of these new technologies are in early stages of development, and therefore specific concepts of operations, operating parameters, or training requirements have not yet been developed and are not available. Specific force structure changes that might affect training requirements at NWSTF Boardman are based on the Navy's and ORNG's knowledge of future requirements and based on the level of information available to evaluate potential environmental impacts. Therefore, this EIS, to the extent feasible, evaluates potential environmental impacts associated with the introduction of new platforms and weapons/sensor systems. Should additional requirements for the use of platforms and weapon systems be needed, separate NEPA and environmental documentation would be required to analyze potential impacts.

2.4.3 FORCE STRUCTURE CHANGES

The Navy and ORNG have identified future platforms that could be incorporated into training requirements at NWSTF Boardman within their planning horizon for this EIS. The following subsections describe the new equipment that could be operating at NWSTF Boardman under Alternative 1.

2.4.3.1 F-35 Lightning II (Joint Strike Fighter)

The F-35 Lightning II (F-35C) is a single-engine, stealthy, supersonic, multi-role fighter optimized for air-to-ground operations, designed to meet the needs of the Air Force, Navy, Marine Corps, and allies, with improved survivability, precision engagement capability, the mobility necessary for future joint operations, and reduced life-cycle costs. Additional systems on the F-35C include: Advanced Electronically Scanned Array multi-function radar, electronic countermeasures equipment, electro-optical targeting system, Distributed Aperture Infrared Sensor thermal imaging system, and advanced helmet-mounted display. Current projections do not have the F-35C utilizing NWSTF Boardman until late 2015. However, with the introduction of the F-35C, an increase in the expenditure of 25 mm rounds and air-to-ground practice bombs on NWSTF Boardman is anticipated. The F-35C is not currently planned for basing with Navy units in the northwest (U.S. Department of the Navy 2014); however, as with other military aircraft types, potential infrequent utilization of NWSTF Boardman is possible from transient units.

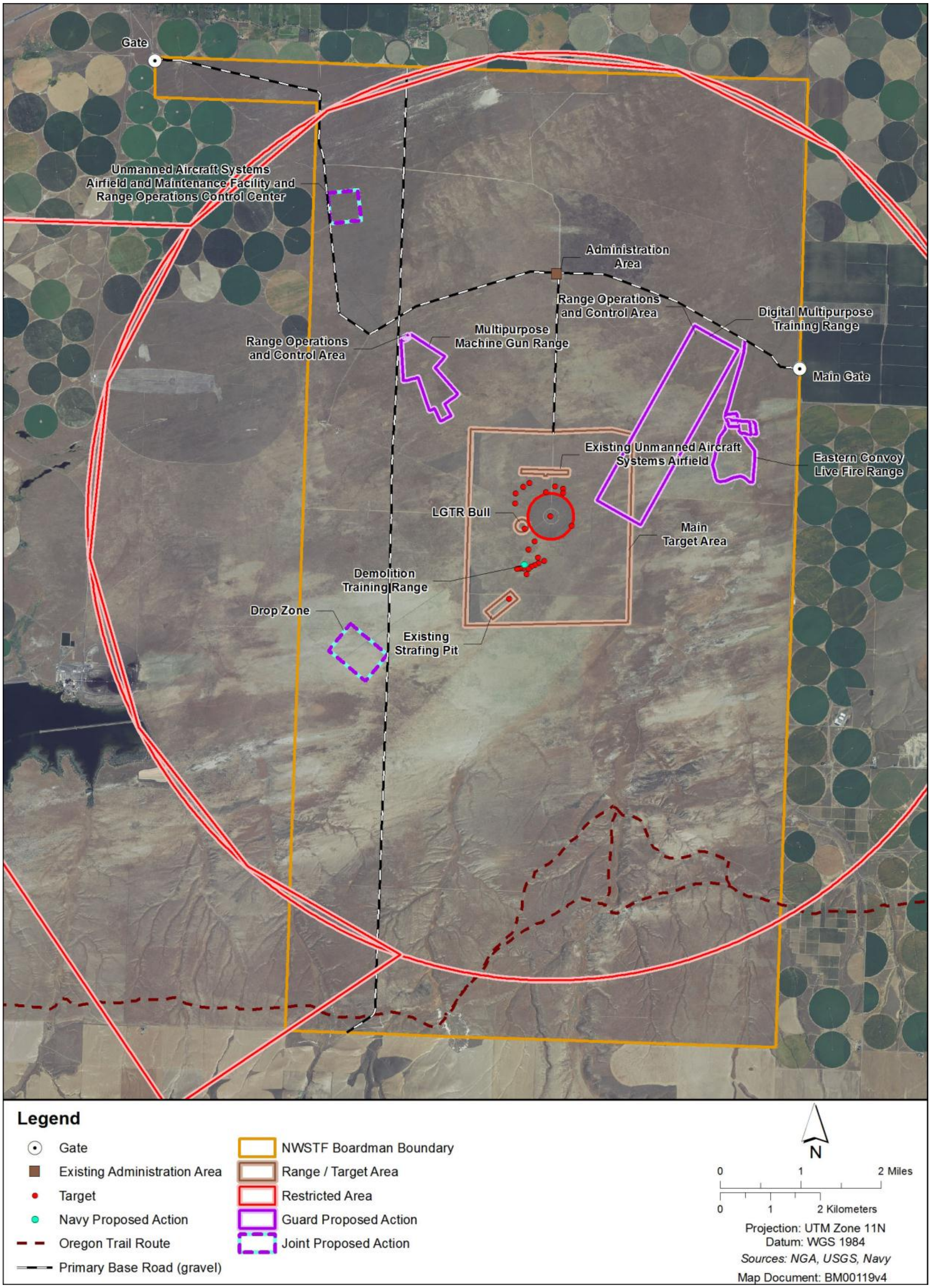
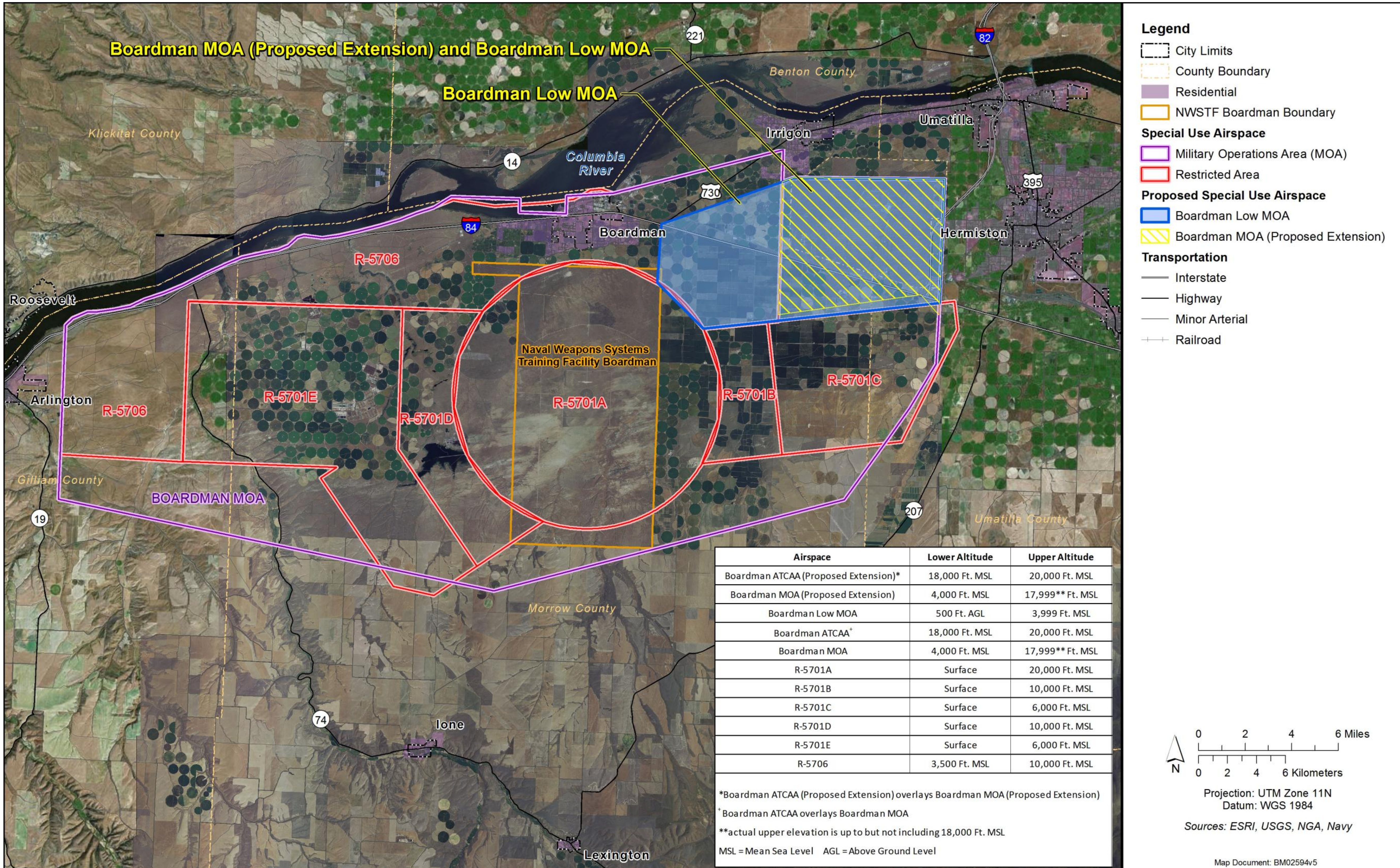


Figure 2-4: Proposed Navy and ORNG Range Enhancements under Alternative 1



Airspace	Lower Altitude	Upper Altitude
Boardman ATCAA (Proposed Extension)*	18,000 Ft. MSL	20,000 Ft. MSL
Boardman MOA (Proposed Extension)	4,000 Ft. MSL	17,999** Ft. MSL
Boardman Low MOA	500 Ft. AGL	3,999 Ft. MSL
Boardman ATCAA+	18,000 Ft. MSL	20,000 Ft. MSL
Boardman MOA	4,000 Ft. MSL	17,999** Ft. MSL
R-5701A	Surface	20,000 Ft. MSL
R-5701B	Surface	10,000 Ft. MSL
R-5701C	Surface	6,000 Ft. MSL
R-5701D	Surface	10,000 Ft. MSL
R-5701E	Surface	6,000 Ft. MSL
R-5706	3,500 Ft. MSL	10,000 Ft. MSL

*Boardman ATCAA (Proposed Extension) overlays Boardman MOA (Proposed Extension)

+Boardman ATCAA overlays Boardman MOA

**actual upper elevation is up to but not including 18,000 Ft. MSL

MSL = Mean Sea Level AGL = Above Ground Level

Figure 2-5: Proposed Special Use Airspace

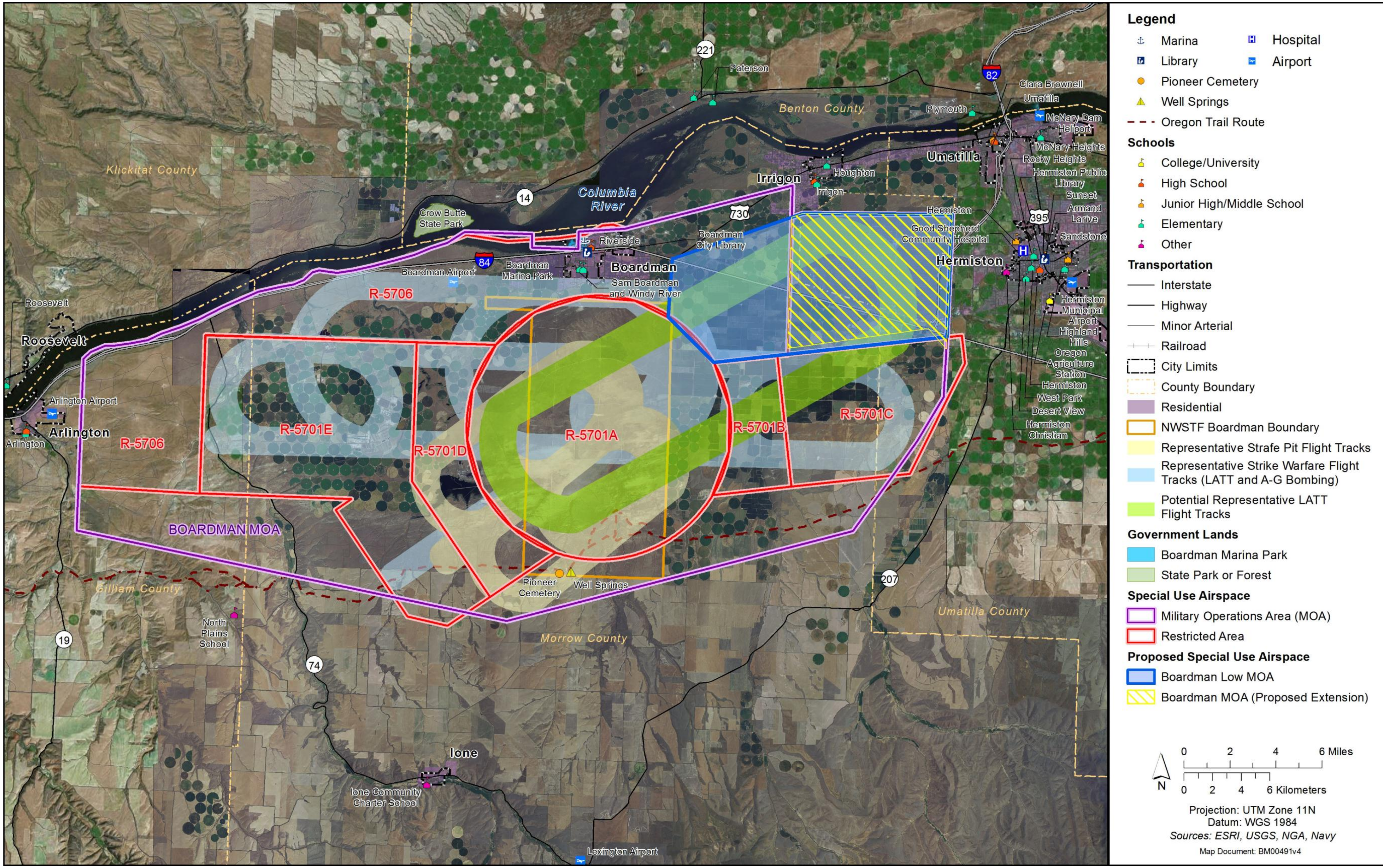


Figure 2-6: Proposed Flight Tracks Utilizing Additional Military Operations Area

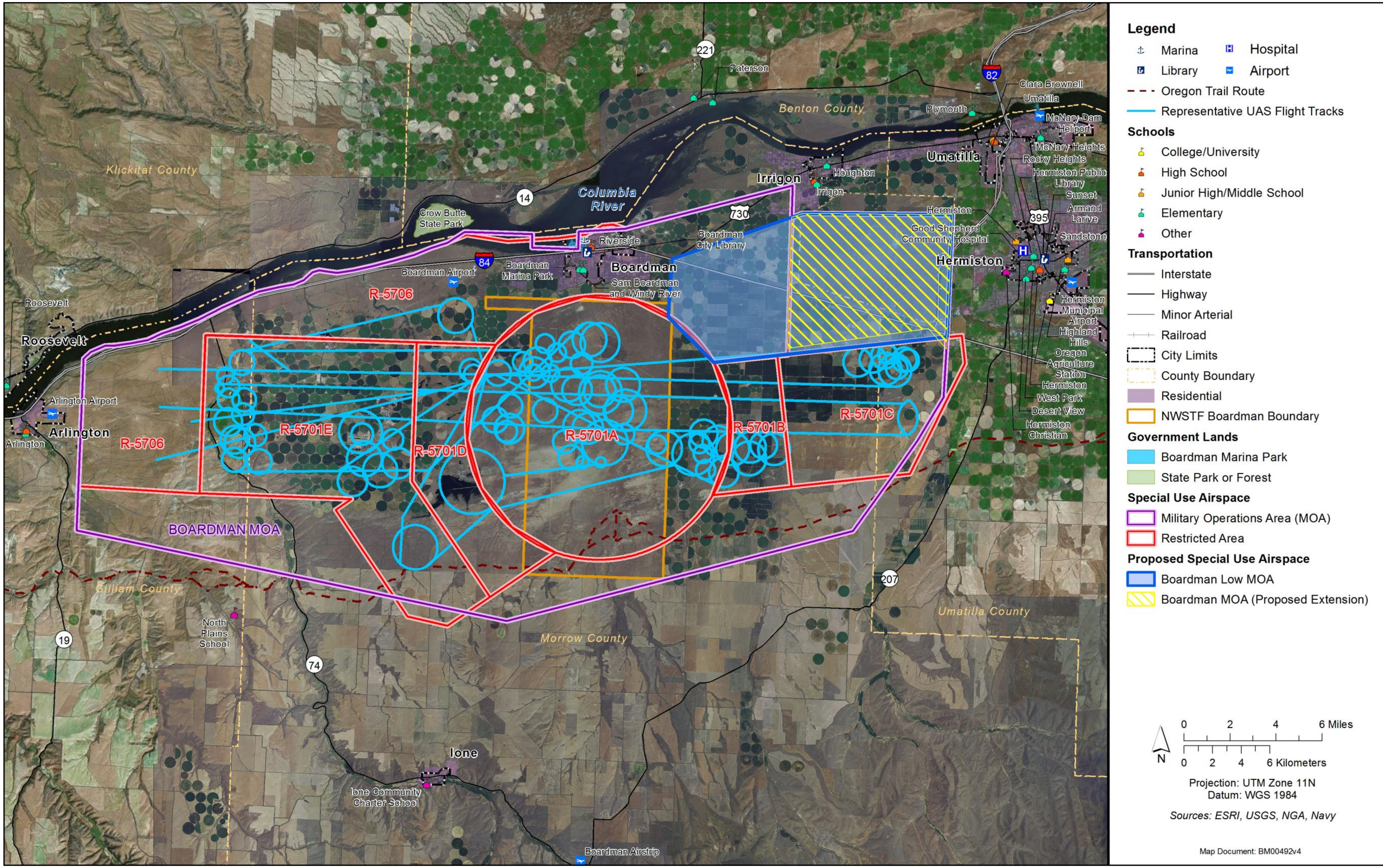


Figure 2-7: Representative UAS Flight Tracks

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2.4.3.2 Unmanned Aircraft Systems

The NWSTF Boardman mission includes supporting UAS activities. Therefore, a variety of UAS platforms and emerging technologies will continue to be operated in the NWSTF Boardman Restricted Area. While specifics regarding future UAS platforms are unknown, they are expected to be similar to platforms historically used at NWSTF Boardman, particularly from an environmental effects perspective. Therefore, this EIS assumes that the UAS platforms used under Alternatives 1 and 2 would be within the range of systems historically used at NWSTF Boardman and described under the No Action Alternative in Section 2.3.1.4 (Unmanned Aircraft Systems Operations).

2.4.3.3 Stryker Vehicle

The Stryker is an eight-wheeled rubber-tired combat vehicle that is lighter, smaller, and more readily deployable than current Army combat vehicles, but armed with similar weapons systems. The Stryker combines the capacity for rapid deployment via C-130s, with survivability and tactical mobility in close and urban terrain. The Stryker is lightweight (19 U.S. tons [17,236.8 kg]) and has the ability to move quickly (62 miles per hour [mph] [99.8 kilometers per hour] top speed) along existing road networks. In addition to these capabilities, the Stryker offers state of the art Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance suites.

2.4.4 REQUIRED RANGE ENHANCEMENTS

The Navy and ORNG have identified specific enhancements to optimize range capabilities required to adequately support training for all missions and roles assigned to NWSTF Boardman. Enhancements were based on capability shortfalls (or gaps) and were assessed using the Navy range required capabilities as defined by the Ranges Required Capabilities Document and the Army Training Circular 25-8. Table 2-5 (located near the end of this chapter) provides a summary of the range enhancements proposed under Alternative 1, Table 2-6 (located near the end of this chapter) provides the anticipated construction effort in months, though the actual construction start dates have yet to be determined, and Figure 2-4 shows proposed locations of the enhancements. Construction, operation, and maintenance of the range enhancements are discussed below.

2.4.4.1 Establishment and Use of Additional Special Use Airspace

To meet Navy Mission Essential Tasking, the EA-18G Growler aircraft stationed at NAS Whidbey Island have a training requirement that necessitates low-altitude flying. Established wind energy projects have reduced the usable airspace for LATT from 205 square nautical miles (nm^2) to 193.78 nm^2. Due to the potential development of wind energy projects in and around R-5701 airspace, larger portions of R-5701C in the southeast and R-5701E may no longer be usable for low-altitude flight training. Range capacity at other military installations is very limited and the expectation of range time availability at other ranges is problematic. Flight training capacity at other military installations with low-level restricted-use airspace is very limited and the airspaces at other Navy or DoD ranges outside of Boardman do not have the capacity to accommodate additional flight training time. All military installations with low-level restricted-use airspace are fully scheduled by locally assigned aircrews currently training in those airspaces. It is not possible to obtain sufficient training time within another installation's airspace for the aircraft crews at NAS Whidbey Island, who require more than 2,000 hours of daytime use. If aircraft crews are unable to accomplish their required training, they would be required to obtain waivers of necessary training qualifications and might even have to deploy without this important training. A more complete analysis of alternative training airspace is provided in Section 2.6.1 (Constructing Range Enhancements and Conducting Training at Locations Other Than NWSTF Boardman).

A solution to this problem is the creation of the Boardman Low MOA (with a lower altitude of 500 ft. [152.4 m] AGL and upper altitude of 3,999 ft. [1,218.9 m] MSL) as shown in Figure 2-5. This new training airspace would be 46 nm^2 and join the current Boardman MOA. The Boardman Low MOA and the Boardman MOA (Proposed Extension) (with a lower altitude of 4,000 ft. [1,219 m] MSL and upper altitude of 17,999 ft. [5,486.1 m] MSL) would overlie the previous national security area that was above the Umatilla Chemical Depot. The Umatilla Chemical Depot National Security area had a zone of surface to 5,000 ft. MSL, but was dis-established in May of 2015. A National Security Area is only “active” during emergencies, all other times it is a recommended no-fly area. Low-altitude flight tracks would be oriented along a northeast axis to facilitate the use of the new MOA airspace, avoiding existing wind turbines on the far eastern end of R-5701C (see Figure 2-6).

It is important to note that the proposed airspace would not be designated as a restricted area. The difference between a MOA and a restricted area is that, in a MOA, military aviation units may be using the airspace, but they are not engaged in any firing or bombing activities. Restricted areas denote the existence of unusual, often dangerous, hazards to aircraft such as weapons firing, aerial gunnery, or UAS activities.

2.4.4.2 Construction and Operation of MPMGR with Heavy Sniper Overlay

2.4.4.2.1 Construction

The ORNG would use the MPMGR to train Soldiers in the use of various crew-served small arms such as the M240B 7.62 mm machine gun, the M249 5.56 mm machine gun, MK19 40 mm Grenade Machine Gun, and the M2 .50 caliber (cal) machine gun. The proposed design is essentially the same as the Army-Standard MPMGR depicted in Department of the Army Training Circular 25-8, with the addition of one heavy sniper range lane, which includes additional targets and extends from 4,921.3 ft. (1,500 m) to 5,823.5 ft. (1,775 m) (Figure 2-8). Various sniper rifles, up to and including the .50 cal sniper rifle, would be used on the heavy sniper range lane.

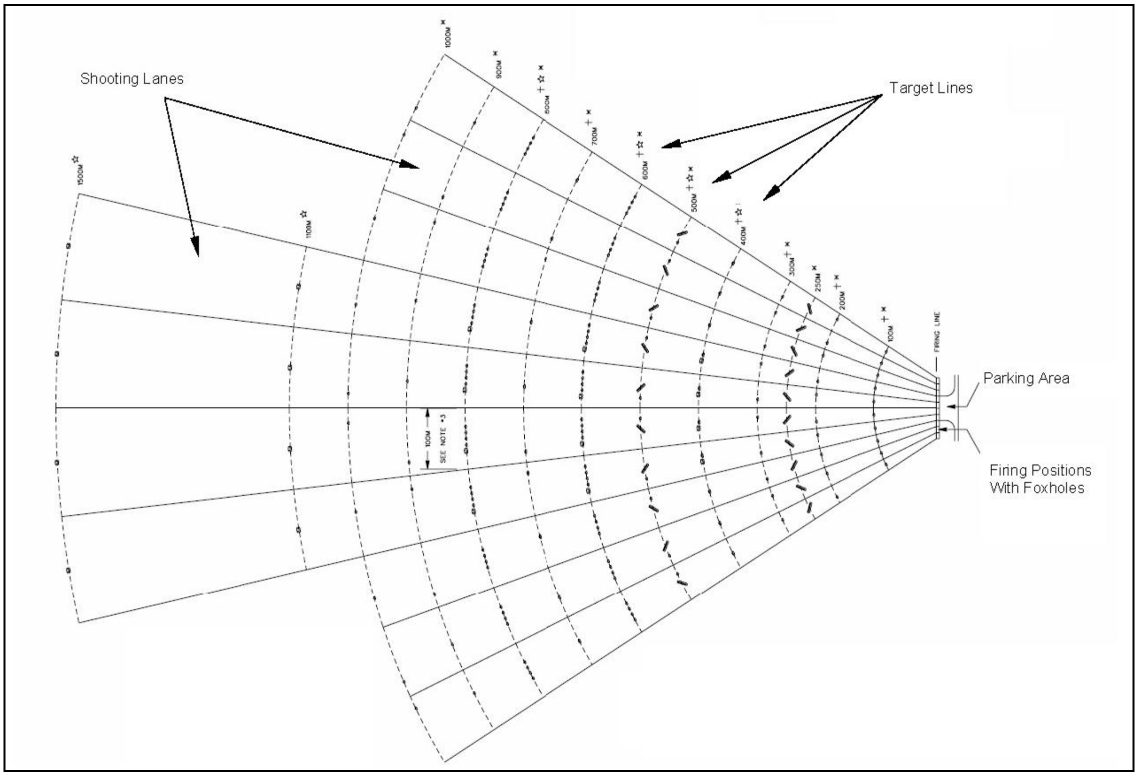

Figure 2-8: Army-Standard Multipurpose Machine Gun Range

The MPMGR would consist of 10 firing lanes with multiple stationary and moving targets in each lane. Six of the firing lanes extend to 3,280.8 ft. (1,000 m). Four lanes extend to 4,921.3 ft. (1,500 m). One 4,921.3 ft. (1,500 m) lane would be lengthened to 5,823.5 ft. (1,775 m) and would contain additional targetry for training and qualification with sniper weapons. The range would be constructed so that the firing points would accommodate a parked vehicle with a mounted machine gun. The range would contain a total of 151 target emplacements. Each target would be mounted on a mechanism to raise the target when it is activated or create a moving target. Each target support structure would be set on a concrete or gravel pad behind an earthen berm to shield the target support equipment from projectile damage. Utility trenching would be required to bring underground power, control, and data cable from the range control tower to each target emplacement within 4,921.3 ft. (1,500 m) of the firing points on the range, targets beyond that would be battery powered and Radio Frequency operated.

Close to the MPMGR, the ORNG also would construct a 10 lane zero range. The zero range would allow Soldiers to adjust (“zero”) the sights of their weapons, each using a single target at a distance of 32.8 ft. (10 m), prior to shooting on the MPMGR. The zero range would be approximately 32.8 ft. by 131.2 ft. (10 m by 40 m) in size and would include a range control tower. The Range Operations and Control Area would provide support facilities for the MPMGR. It would occupy approximately 2.2 acres (ac.) (0.89 hectare [ha]) and would consist of about eight small metal-sided buildings, a gravel vehicle parking area, and gravel walking paths. One building would be elevated on legs and used as a control tower. Another would be a ground-level storage building. Other structures include a set of covered bleachers, a general instruction building (classroom), an after-action review building, a covered eating area, an ammunition breakdown building, and concrete slabs for placement of self-contained portable latrines. The layout of the range and Range Operations and Control Area would be sited so as to minimize disturbance and reduce effects to sensitive species where possible.

The MPMGR, along with an associated zero range, Range Operations Control Area, access roads, parking areas, and maintenance trails to access the target emplacements would encompass approximately 260 ac. (105.2 ha). Surface danger zones (SDZs, Figure 2-11) for the MPMGR and zero range would cover approximately 12,500 ac. (5058.6 ha). The MPMGR and the zero range would be sited so both ranges could operate simultaneously and so that their SDZs would overlap the existing main target area (see Figure 2-1). A SDZ is the mathematically predicted, three-dimensional area that a projectile or fragment could travel through the air and impact the earth, either by direct fire or ricochet. A SDZ is calculated using procedures found in Department of the Army Pamphlet 385-63 - Range Safety. Except for areas on the ranges themselves, none of the areas within SDZs would be disturbed during construction. A SDZ serves only as a human safety buffer downrange from a firing point.

Of the 260 ac. (105.2 ha) occupied by the MPMGR and associated development, approximately 27.5 ac. (11.1 ha) would be disturbed during construction. The disturbance would consist of the construction of access roads, parking areas, maintenance trails, the Range Operations and Control Area, weapons firing positions, target emplacements, earthen berms, and associated underground power control and data cables. Of the 27.5 ac. (11.1 ha) of disturbed area, approximately 11.6 ac. (4.7 ha) would be revegetated with native vegetation following construction. The remaining 15.9 ac. (6.4 ha) would contain buildings, concrete structures, or gravel surfaces and would remain permanently altered.

Construction of the MPMGR would be accomplished using typical construction equipment. Building materials, including concrete and gravel and soil for berms, would likely be imported from one or more off-site sources. The Range Operations and Control Area parking area would be constructed first and used for staging construction of the MPMGR and the remainder of the Range Operations and Control Area. Additional construction staging areas, if needed, would be established within previously disturbed areas at the Navy administrative area.

2.4.4.2.2 Operation and Maintenance

The ORNG would use the MPMGR and associated zero range year-round, approximately 117 days annually. Typically, use would occur primarily on weekends between approximately 9:00 a.m. and 6:00 p.m., although some night time training and qualification also would be conducted. Firing would typically occur in approximately 20-minute blocks while the range is in use. Firing time for a day would usually be around 2 hours, with breaks in shooting to change crews, take meal breaks, repair targets, and for other reasons.

Except for tracer rounds, all ammunition used on the range would be inert/non-explosive. Munitions casings would be collected at the conclusion of training. Tracer rounds would be prohibited during periods of high fire danger. Tracer ammunition (tracer rounds) are bullets that are built with a small pyrotechnic charge in their base. Ignited by the burning powder, the pyrotechnic composition burns very brightly, making the projectile visible to the naked eye. This enables the shooter to follow the bullet trajectory in order to make aiming corrections. If pyrotechnic devices, such as smoke grenades, were used, they would be placed in metal containers to minimize their potential to start a fire.

Maintenance activities on the range would include periodic maintenance, repair, and replacement of targets and target support mechanisms. Periodic vegetation control on the range will be conducted to reduce fire fuel loading or manage exotic vegetation.

Solid wastes would be collected for transportation and disposal at permitted off-site solid waste management facilities. No on-site waste disposal is planned. Waste from the portable latrines would be removed periodically by a local contractor and transported to a local treatment facility by a contractor.

2.4.4.3 Construction, Operation, and Maintenance of a DMPTR

2.4.4.3.1 Construction

The ORNG would use the DMPTR to train with larger wheeled and tracked vehicles mounted with crew-served weapons, including the M1A1 Abrams Main Battle Tank equipped with a 120 mm cannon, .50 caliber (cal) machine gun, and 7.62 mm machine gun; the M2 Bradley Infantry Fighting Vehicle and M3 Bradley Cavalry Fighting Vehicle, both equipped with a 25 mm automatic gun, 7.62 mm machine gun, and Tube-launched, Optically tracked, Wire-guided (TOW) missiles; and High Mobility Multipurpose Wheeled Vehicles (HMMWV) equipped with TOW missiles, MK 19 40 mm machine guns, and .50 cal machine guns. The range would occasionally be used for training by helicopter crews equipped with 5.56 mm and 7.62 mm cal machine guns. Future weapons platforms could include the Stryker vehicle equipped with similar weapons systems. This range also would be used for dismounted infantry squad tactical live fire operations either independently of, or simultaneously with, supporting vehicles.

The DMPTR would be constructed essentially the same as that depicted in Army Training Circular 25-8 and would encompass an area approximately 3,280.8 ft. (1,000 m) wide by 11,482.9 ft. (3,500 m) deep (865 ac. [350.1 ha]). This area does not include the associated Range Operations and Control Area facilities, which would be the same in design as described for the MPMGR. The Range Operations and Control Area would occupy approximately 2.2 ac. (0.89 ha).

The range consists of two generally parallel vehicle trails 492.1 ft. (150 m) apart, each approximately 19.7 ft. (6 m) wide and 8,202.1 ft. (2,500 m) long that would connect with one another at the end and in the middle. Each trail would contain four hardened weapons firing positions. Each battle position would consist of a short side trail, firing pad, and protective berm. The range would contain approximately 62 target emplacements. The emplacements would be installed on either side of and between the two vehicle trails and approximately 4,101.05 ft. (1,250 m) beyond the end of the trails. The targets would consist of a variety of stationary and moving targets set in earthen berm-protected emplacements. Target emplacements may be excavated to reduce the size of the protective berms and better conceal the targets when they are not active. The target emplacements would be underlain by concrete or gravel pads to support target lifting and movement mechanisms. Utility trenching would be required to bring underground power, control, and data cable from the range control tower to each of the newly installed target emplacements on the range. Approximately 26,246.7 ft. (8,000 m) of 9.8 ft. (3 m) wide gravel maintenance trails would be constructed to allow range staff to access target emplacements and conduct maintenance and repair activities.

Surface danger zones for the DMPTR would cover approximately 14,300 ac. (5,787.01 ha). Approximately 6,500 ac. (2,630.5 ha) of the DMPTR SDZs would overlap the SDZ areas for the MPMGR, associated zero range, and main target area (Figure 2-11). Most of this area is not expected to be disturbed by the impact of any munitions.

In total, construction of the DMPTR would disturb approximately 45 ac. (18.2 ha) within the range footprint of 865 ac. (350.1 ha). Approximately 21.4 ac. (8.7 ha) would be revegetated following range construction and approximately 23.6 ac. (9.6 ha) would contain gravel or concrete surfaces or buildings and would remain permanently altered.

Construction of the DMPTR would be accomplished using typical construction equipment. Building materials, including concrete and gravel and soil for berms, would be imported from one or more off-site sources. The Range Operations and Control Area parking area would be constructed first and used as a construction staging area. Additional construction staging areas, if needed, would be established within previously disturbed areas at the Navy administrative area.

2.4.4.3.2 Operation and Maintenance

A tracked or wheeled vehicle using the DMPTR would drive to a specified firing point (battle position) along one of the two parallel trails. The crew would detect activated targets and engage the targets with one or more of the vehicle's weapons from that position. The vehicle then would proceed to another specified firing point, then detect and engage other activated targets.

ORNG Soldiers trained in Helicopter Door Gunnery must complete a progressive training program consisting of 10 training stages during the training year that include both day and night operations. ORNG Soldiers progress from individual weapons qualification on an MPMGR with weapons removed from the aircraft, through firing from a static aircraft on the ground. Later training stages include live fire qualifications up to and including multi-aircraft live fire training. ORNG rotary-wing A-G GUNEXs at NWSTF Boardman would typically include two to four aircraft with one to two door gunners each engaging targets on the ground as the aircraft descends to approximately 200 ft. (60.9 m) AGL and passes over the DMPTR from northeast to southwest. The gunners conduct live fire training for up to 8 hours over a 2-day period learning to defend the aircraft during its most vulnerable maneuvers of landing and taking off. Each aircraft is equipped with a door mounted 7.62 mm machine gun on each side. If the DMPTR SDZ allows, both right and left door gunners could engage targets simultaneously. A total of approximately 20 door gunners firing up to 1,200 rounds each would train in live fire A-G GUNEX annually.

Infantry squads would use the range during live fire exercises by moving down the range on foot. Soldiers would detect targets activated in front of them and engage the targets with small arms fire.

The ORNG would use the DMPTR approximately 21 days annually. Typically, use would occur primarily on weekends between approximately 9:00 a.m. and 6:00 p.m., although some night time training and qualification also would be conducted. Firing would occur intermittently over an approximately 45-minute period to complete the DMPTR course.

Except for tracer rounds, all ammunition used on the range would be inert/non-explosive. Munitions casings would be collected at the conclusion of training. Tracer rounds would be prohibited during periods of high fire danger. If pyrotechnic devices, such as smoke grenades, were used, they would be placed in metal containers to minimize their potential to start a fire.

Maintenance activities on the range would include periodic maintenance, repair, and replacement of targets and target support mechanisms. Periodic vegetation control may be required to reduce fire fuel loading or manage exotic vegetation and would be conducted as authorized in approved natural resource and fire management plans.

Solid wastes would be collected for transportation and disposal at permitted off-site solid waste management facilities. No on-site waste disposal is planned. Waste from the portable latrines would be removed periodically by a local contractor and transported to a wastewater treatment plant.

2.4.4.4 Construction, Operation, and Maintenance of an Eastern Convoy Live Fire Range

2.4.4.4.1 Construction

The eastern CLFR would be used to train Soldiers in conducting vehicle convoy operations, up to and including immediate action response using weapons live fire against encountered threats. The eastern CLFR would be developed along an approximately 5 mi. (8 km) route on the eastern portion of NWSTF Boardman and may be connected to the DMPTR via an existing two-track road. Portable targets would be sited within approximately 328.1 ft. (100 m) of the road course and used to simulate an ambush. The targets would be periodically relocated to change training scenarios. Temporary structures, such as plywood facades, steel shipping containers (conex boxes), or hay bale walls, may be used to simulate small urban environments and help conceal targets. No permanent construction or alteration of the existing terrain would be anticipated for the eastern CLFR.

The ORNG has sought to develop a proposed CLFR on NWSTF Boardman such that (1) existing roads would be used, (2) the SDZ would be completely contained within the installation boundaries, and (3) the more valuable wildlife habitat located on the southern portion of the installation would be avoided (see Figure 2-1). These factors have resulted in the proposal to locate the CLFR along an existing north/south road to the east of the proposed DMPTR with potential targets located toward the center of NWSTF Boardman. The SDZs for this range would be mostly within those of the proposed MPMGR and DMPTR and the existing main target area.

Construction of the range would consist of graveling existing two-track roads to support increased vehicle traffic and to reduce fugitive dust emissions during training. Construction also would involve placing portable target-lifters within 328.1 ft. (100 m) of the existing roads and encircling them with sandbags and steel plates to protect the battery power-supply and radio controllers from damage. The target lifters would encompass an area approximately 2 by 3 ft. (0.6 by 1.8 m). Shipping containers, plywood, and hay bales may also be used to create building facades and simulated village walls.

2.4.4.4.2 Operations and Maintenance

Up to Platoon-sized (25 to 50 personnel) convoys armed with M249, M240B, M2, and MK 19 machine guns would navigate the installation roads training in Command, Control, and Communications; upon entering the CLFR or connecting DMPTR, the range would become “hot” (firing activities can occur) and units would detect activated targets and engage those simulated hostile targets. Training would occur according to standardized procedures and under the guidance of a Range Safety Officer up to 45 days a year.

Except for tracer rounds, all ammunition used on the CLFR would be inert/non-explosive. Use of tracer rounds would be prohibited during periods of high fire danger. Any pyrotechnic devices would be placed in metal containers to minimize their potential to start a fire. Training would take place during both day and night hours.

Range maintenance would entail typical gravel road maintenance and periodically servicing the power supply and radio controllers of the target lifters. Targets may be relocated to vary the training scenarios and former target locations would be revegetated with native species. Periodic vegetation control may be required to reduce fire fuel loading or manage exotic vegetation and would be conducted as authorized in approved natural resource and fire management plans.

2.4.4.5 Construction and Operation of a Demolition Training Range

Under Alternative 1, the Navy proposes to construct a DTR to accommodate land demolition training (see Figure 2-4). The range would be constructed as a roofless structure with 10 ft. (3.1 m) berms on each side of the square range to reduce detonation fragments outside the immediate range area. Details regarding munitions that would be used in the DTR and frequency of use are outlined in Tables 2-1 and 2-3. Additionally, Office of the Chief of Naval Operations Instruction 3501.97G requires that explosive ordnance disposal personnel conduct periodic demolition training in order to retain qualifications, and the DTR will assist in maintaining those qualifications. The DTR would be utilized up to 50 times annually and would support a Net Explosive Weight of 200 lb. (90.7 kg), though only two detonations per year would be at that explosive weight. Munitions used yearly at the NWSTF Boardman DTR would include two 200 lb. (90.7 kg) shots, five 100 lb. (45.4 kg) shots, ten 50 lb. (22.7 kg) shots, twenty 25 lb. (11.3 kg) shots, and thirteen shots under 25 lb. (11.3 kg). DTR activities typically take place between 10:00 a.m. and 4:00 p.m., but may occasionally fall outside these hours to meet training requirements. DTR activities will not take place after dark. Explosive demolition training is not normally planned to occur in the June to September time frame to help mitigate wildland fire potential, though seasonal conditions training times may vary.

2.4.4.6 Construction, Operation, and Maintenance of an UAS Training and Maintenance Facility and Range Operations Control Center

An ORNG platoon is assigned to operate and maintain the RQ-7B (Shadow 200) tactical UAS. The platoon is currently equipped with four Shadow 200 aircraft, ten trucks, and nine trailers. The Shadow 200 is a composite structure aircraft with a 14 ft. (4.3 m) wingspan, powered by a small, gasoline-fueled, rotary engine. The Shadow 200 can carry 15 gallons (56.8 liters) of fuel and 60 lb. (27.2 kg) of sensor and electronic warfare systems equipment and has a maximum flight endurance of 6 to 7 hours. The Shadow is designed for reconnaissance missions and does not currently have a strike capability.

2.4.4.6.1 Construction

The ORNG would construct a UAS training and maintenance facility and joint-use Range Operations Control Center that would consist of a single building (approximately 12,200 square feet [$ft.^2$] [1,133.4 square meters {m^2}]) for platoon operations, training, maintenance, storage associated with the Shadow 200 aircraft, as well as for Navy and ORNG NWSTF Boardman range control personnel to work. The building would be constructed of metal or masonry and would contain space for a UAS maintenance shop, equipment storage, flight simulator, and administrative offices. The facility also would include a building (approximately 4,800 $ft.^2$ [446.03 m^2]) for the storage of ground vehicles and a paved UAS runway and an unpaved operations area. The runway would be approximately 50 ft. (15.2 m) wide and 1,000 ft. (304.8 m) long. A gravel operating area used for a UAS launcher, UAS control equipment, and portable generators, would be 164 ft. (50.01 m) wide and 700 ft. (213.4 m) long. The runway would be oriented east to west, the direction of the prevailing winds. A vehicle parking area would be constructed adjacent to the operations and maintenance building. A 500-gallon (1,892.7-liter) aboveground fuel tank in a secondary containment would be located in the vicinity of the building. Additional gravel wildland fire buffers would surround the facility. A well would be drilled in the vicinity of the building to provide non-potable water and a septic system and leach field would be installed for wastewater disposal. In total, the facility is expected to occupy approximately 7 ac. (2.8 ha). The existing road between the northwest gate onto NWSTF Boardman and the UAS training and maintenance facility may be improved to support construction operations access by grading the road and adding rock and gravel.

The UAS facility would be built using typical construction equipment and techniques. Building materials, including concrete and gravel and soil for berms, would likely be imported from one or more off-site sources.

2.4.4.6.2 Operations and Maintenance

The UAS platoon would have a full-time staff of approximately seven Soldiers working at the facility. During drill weekends and annual training periods, the full platoon of 27 Soldiers would be present at the facility. Training on UAS simulators, maintenance and repair of the UAS, and UAS flights would occur at the facility. Maintenance of the truck and trailer rolling stock would likely occur at ORNG facilities located elsewhere in the state.

The Scan Eagle UAS is a relatively small aircraft that is currently operated at NWSTF Boardman. Typically, these activities are conducted in NWSTF Boardman airspace, result in 800 to 1,000 sorties a year, and consist of testing and training. The UAS activity lasts approximately 6 hours. UAS activities can be conducted in Restricted Area 5701 and Restricted Area 5706. Scan Eagle UAS RDT&E activities in Restricted Area 5701 and Restricted Area 5706 are anticipated to continue. The Broad Area Maritime Surveillance system is a future Navy system that may be used for training within Restricted Area 5701 and Restricted Area 5706. The specific UAS to be used for this system has yet to be determined, but it will likely be a large aircraft such as the Global Hawk, Predator B, or a similar UAS. These aircraft are roughly the size of common military tactical aircraft such as the EA-6B Prowler or FA-18 Hornet. If the Broad Area Maritime Surveillance system is likely to have a strike capability, that training would be covered in a separate NEPA analysis.

2.4.4.7 Establishment and Use of a Drop Zone

A drop zone would be established at the location shown in Figure 2-4 under Alternative 1. The drop zone would be approximately 2,250 ft. (685.5 m) by 3,150 ft. (960.1 m), with an approximate footprint of 167.2 ac. (65.8 ha). No construction or ground disturbance would be required to establish the drop zone. The drop zone would be a designated area, certified to be clear of obstructions (such as fences or telephone poles) for the safety of personnel conducting parachute operations.

Insertion and extraction activities train military forces to deliver and extract equipment and personnel using a variety of techniques. These activities encompass parachute, fastrope, rappel, and troop extractions. The C-130 aircraft, HH-53, CH-46, CH-47 and UH-60 helicopters are typically used for equipment and personnel inserts. Insertion and extraction activities at NWSTF Boardman would be centered on paradropping of personnel, military equipment, and supplies. This activity typically lasts anywhere from 30 minutes to 1 hour and would occur up to 12 days annually.

2.5 ALTERNATIVE 2 (PREFERRED ALTERNATIVE) – INCREASE TRAINING ACTIVITIES, ACCOMMODATE FORCE STRUCTURE CHANGES, AND IMPLEMENT DESIRED RANGE ENHANCEMENTS

Alternative 2 (Preferred Alternative) would include all training and testing activities, accommodating force structure changes, and range enhancements described under Alternative 1 (with the exception of the construction and operation of the DMPTR), as well as the following additional range enhancements:

- Establishment and use of three mortar firing positions
- Construction and operation of a second, western, CLFR
- Construction and use of a Range Operations Control Center (separate from the UAS facility)

Implementation of this alternative would include all elements of Alternative 1 (accommodating training activities currently conducted, increasing training activities, accommodating force structure changes, and implementing required range enhancements) except those elements associated with the DMPTR. Due to the changing fiscal priorities impacting the Department of Defense and the services, as well as changing priorities necessary to meet mission requirements, the National Guard Bureau and ORNG are evaluating Alternative 2 without the proposed DMPTR. Under Alternative 2, the DMPTR would not be constructed or operated.

In addition, under Alternative 2, training activities of the types currently conducted would not be increased over levels identified in Alternative 1; however, they would be distributed between existing and proposed ranges. Additional range enhancements include those described in Alternative 1 plus the addition of three mortar pads, a second (western) CLFR, and a new joint-use Range Operations Control Center (Figure 2-9).

As mentioned above, current fiscal constraints are impacting the DoD and the services, as well as changing priorities necessary to meet mission requirements. With these changing priorities and mission requirements, Alternative 2 meets all of the selection criteria identified in Section 2.2.1 (Alternatives Development). Alternative 2 would meet Navy and ORNG minimum required capabilities as documented in the Navy Required Capabilities Document of September 8, 2005 and the U.S. Army Forces Command/Army National Guard/U.S. Army Reserve Regulation 350-2, U.S. Army Reserve 350-1, and Department of the Army Pamphlet 350-8.

2.5.1 CHANGES IN TRAINING AND TESTING ACTIVITIES

Table 2-1, located near the end of this chapter, contains summary data for current (No Action Alternative) and proposed (Alternatives 1 and 2) training and testing activities at NWSTF Boardman, including platforms used, annual number of training events, and location. Table 2-2 through Table 2-4 provide additional information including an estimated total of annual munitions use at NWSTF Boardman (Table 2-2), estimated annual munitions use by range area (Table 2-3), and aircraft overflights in NWSTF Boardman airspace (Table 2-4).

With the exception of firing practice mortar rounds and rounds associated with usage of the DMPTR, the type and amount of training conducted under Alternative 2 would be the same as Alternative 1. The proposed mortar training is described in Section 2.5.2.1 (Establishment and Use of Three Mortar Firing Positions) below. The other range enhancements included in Alternative 2 would support existing training activities or training activities described under Alternative 1. As discussed below, the additional range enhancements under Alternative 2 would diversify training assets at NWSTF Boardman, would allow increased throughput and surge capacity with more simultaneous range operations, increase realism and flexibility, and reduce crew familiarity with target locations so there is less anticipation in the reaction skills.

2.5.2 DESIRED RANGE ENHANCEMENTS

Alternative 2 includes additional range enhancements identified by the Navy and ORNG to optimize range capabilities required to adequately support training for all missions and roles assigned to NWSTF Boardman. Table 2-5 provides a summary of the range enhancements proposed under Alternative 2, Table 2-6 provides the anticipated schedule, and Figure 2-9 shows proposed locations. Construction, operation, and maintenance of the range enhancements are discussed below.

2.5.2.1 Establishment and Use of Three Mortar Firing Positions

Three mortar firing positions would be established at the locations shown in Figure 2-9 under Alternative 2. No construction or ground disturbance would be required to establish the mortar firing points. Surface Danger Zones (SDZs) for the mortar firing positions would be concentrated on the main target bull and not extend off the NWSTF Boardman boundary (Figure 2-10). The M224 60 mm lightweight mortar (or a similar system) would be fired for qualification certification or during ground troop support exercises using practice rounds. The M769 60 mm full-range practice cartridge has a flash-bang/smoke fuse. The M224 system is made up of the cannon, bipod, baseplate, and sight unit.

The system is very portable and is placed on the ground surface, sighted at a stationary target, and fired. Only non-explosive training rounds would be used and these rounds would be retrieved for reuse or recycling after they are fired. Additionally, 81 mm mortars using sub-caliber training rounds would be used and these spent rounds would be retrieved and scrapped after firing. The mortar firing points would be used for 6 days annually, with up to 1,440 rounds being fired annually.

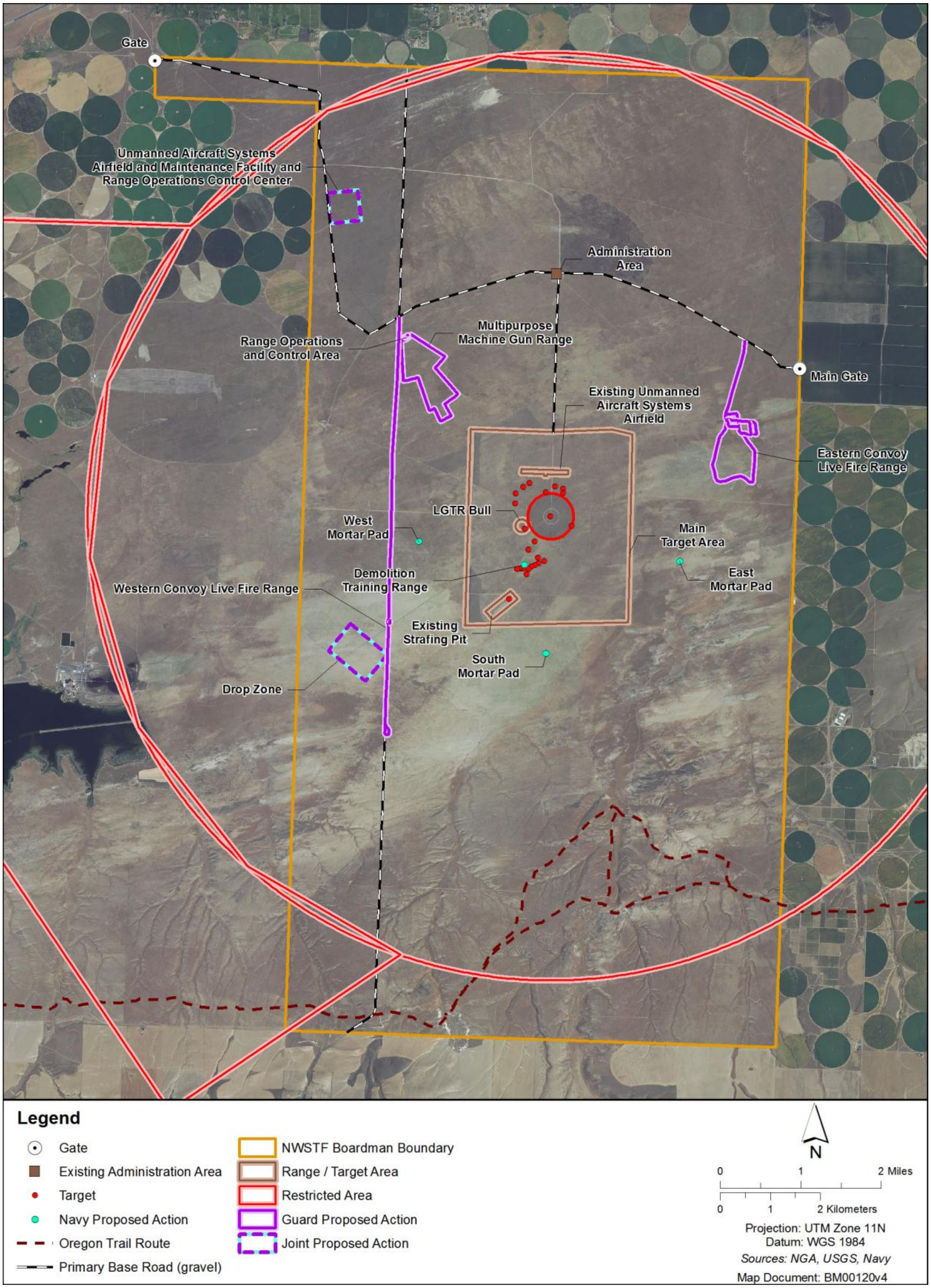

Figure 2-9: Proposed Navy and ORNG Range Enhancements under Alternative 2

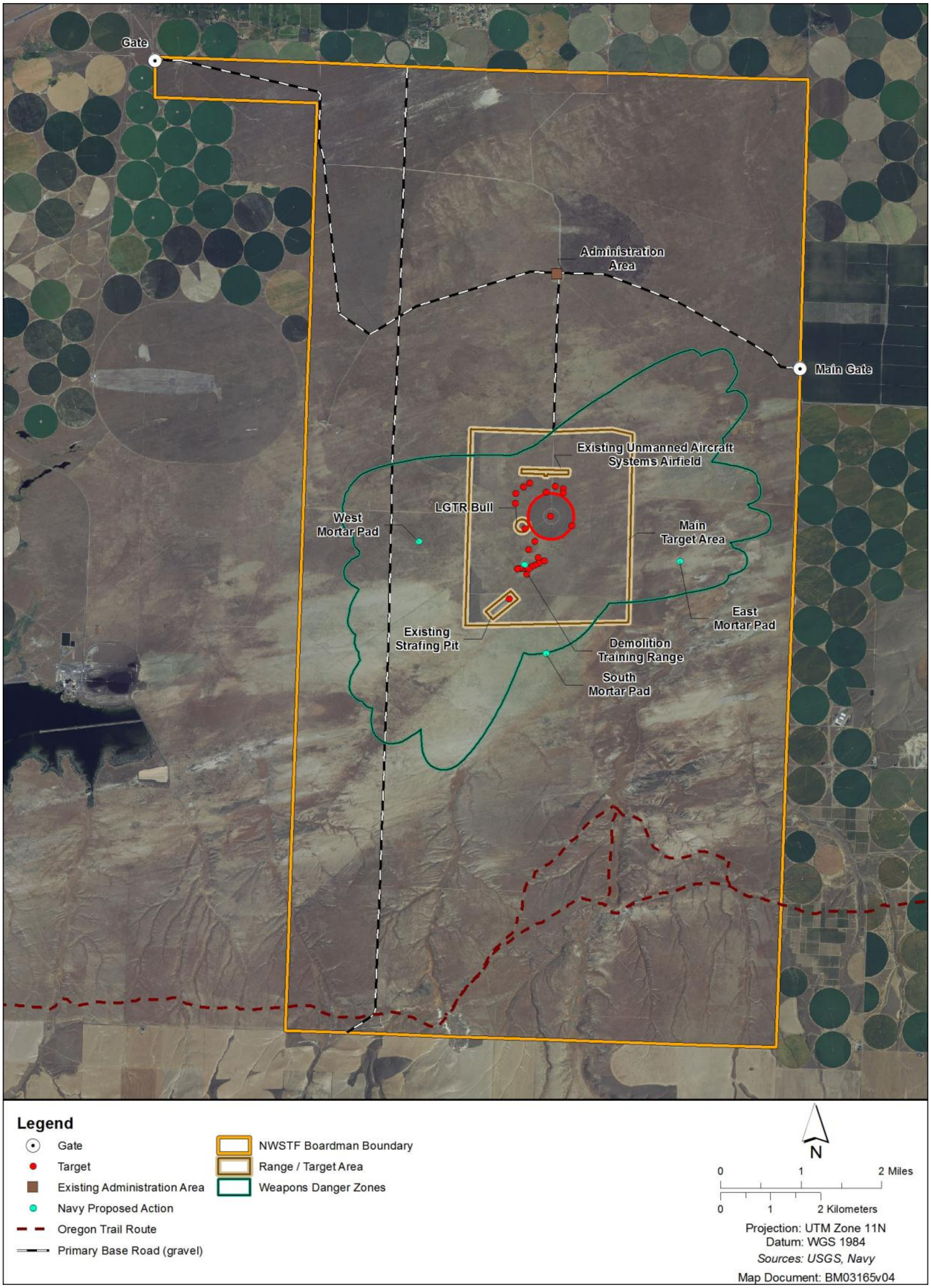

Figure 2-10: Weapons Danger Zones under Alternative 2

2.5.2.2 Construction, Operation, and Maintenance of a Second CLFR

In addition to the eastern CLFR proposed in Alternative 1, a second, western CLFR would allow at least one of the CLFRs to be used while the MPMGR is in use. Having two CLFRs also would permit the ORNG to accommodate surges in required training prior to deployments, when many Soldiers need to be trained in a short period of time. The diversity added by these training assets would also increase training realism.

2.5.2.2.1 Construction

The second CLFR would be established along approximately 4 mi. (6.4 km) of an existing north-south road located west of the proposed MPMGR location and would likely include a simulated traffic round-about near the center of the range and a turn-around area at the southern end (see Figure 2-9). Target emplacements would be located toward the center of NWSTF Boardman to contain the SDZ on NWSTF Boardman (Figure 2-11). The construction and development of the second, western CLFR would be similar to the CLFR described in Section 2.4.4.3 (Construction, Operation, and Maintenance of a DMPTR). The footprint of the western CLFR, not including the SDZ, would cover approximately 68 ac. (27.5 ha). The ORNG has estimated the SDZ for this range would require approximately 11,750 ac. (4,755.1 ha), including the range itself. Most of the SDZs would overlap the SDZs for the MPMGR, eastern CLFR, and the existing main target area (see Figure 2-11).

2.5.2.2.2 Operations and Maintenance

The operation and maintenance of the second CLFR would be similar to the proposed CLFR described in Section 2.4.4.4.2 (Operations and Maintenance). The number of CLFR training events conducted under Alternative 2 would be the same as Alternative 1, but the events would be distributed between the two ranges.

2.5.2.3 Construction and Use of a Joint Use Range Operations Control Center

Alternative 2 would include the construction of an additional building (approximately 10,000 $ft.^2$ [929 m^2]) to house Navy and ORNG range control personnel and equipment, rather than consolidating it with the UAS Training and Maintenance Facility. The Range Operations Control Center building would be constructed in proximity to the UAS Training and Maintenance Facility to enable shared use of a water well, septic system, and electrical service.

2.5.3 RANGE ACTIVITY SUMMARY TABLES

Table 2-1 through Table 2-6 summarize the activities at NWSTF Boardman. Table 2-1 summarizes the training activities under each of the alternatives. Table 2-2 lists the estimated total annual expenditure of munitions and other related training materials. Table 2-3 lists the estimated annual expenditure of munitions by range. Table 2-4 presents the annual summary of aircraft operations. Table 2-5 provides detailed information on each of the range enhancements, and Table 2-6 provides the anticipated construction and operation schedule of the enhancements. Values in these tables are based on historical use, existing requirements, and anticipated future requirements. These values are representative of baseline (No Action Alternative) and anticipated future (Alternatives 1 and 2) range use, and are presented for analysis purposes. Actual values will vary based on specific training requirements, which are influenced by factors such as deployments and world events.

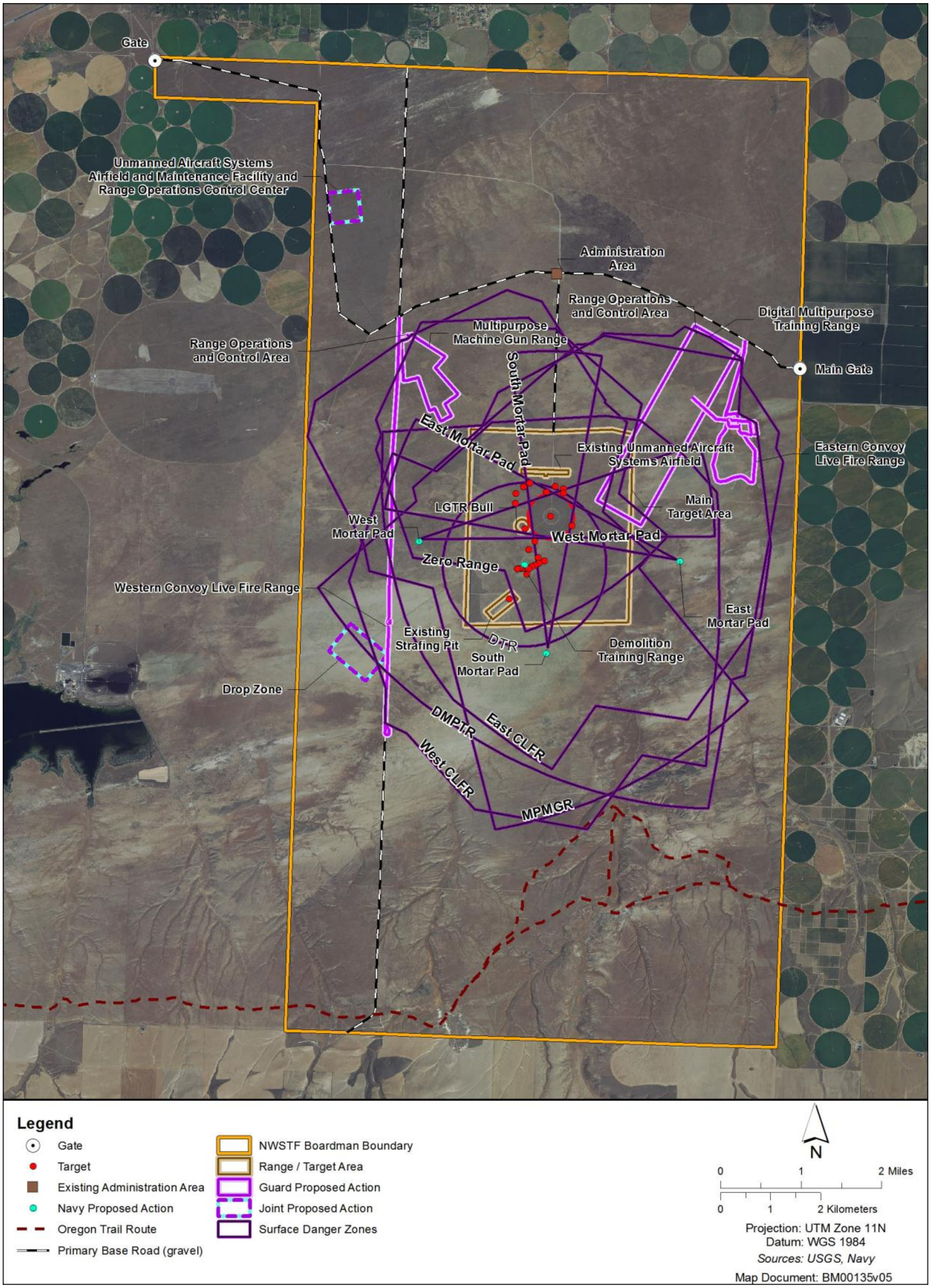

Figure 2-11: Surface Danger Zones under Alternative 2

Table 2-1: Current and Proposed Annual Level of Training and Testing Activities at NWSTF Boardman

Range Activity	Representative Platform	Annual Number of Training Events			Location
		No Action Alternative	Alternative 1	Alternative 2	
Air Warfare					
Surface-to-Air Counter Tactics and Low-Altitude Tactics Training	EA-6B Prowler, EA-18G Growler, F-15, F-16, FA-18, F-35,C-130	257	1,047	1,047	Boardman MOA, Restricted Areas
Strike Warfare					
Air-to-Ground Bombing Exercise	FA-18, F-35, AV-8	133	133	133	Main Target Area
Air-to-Ground Gunnery Exercise	F-15, F-35, CH-47, H-60	20	70	70	Main Target Area, Strafe Pit, MPTR (proposed)
Air-to-Ground Missile Exercise/ High-Speed Anti-Radiation Missile Exercise (non-firing)	EA-6B Prowler, EA-18G Growler	65	180	180	Main Target Area, Boardman MOA, Restricted Areas
Intelligence, Surveillance, and Reconnaissance	P3-C, EP-3, P8, EA-18G Growler, EA-6B Prowler	9	9	9	Boardman MOA, Restricted Areas
Electronic Warfare					
Electronic Attack and Electronic Warfare Support	EA-6B Prowler, EA-18G Growler	193	500	500	Boardman MOA, Restricted Areas
Support Activities					
Unmanned Aircraft Systems/Tactical Unmanned Aircraft Systems Operations	RQ-7, RQ-11	896	1,709	1,709	TUAS Airfield, R-5701 (all), R-5706
Insertion and Extraction	C-130, C-17, C-23 HH-53, CH-46, CH-47 UH-60	0	12 Days	12 Days	NWSTF Boardman, Drop Zone (Proposed)
Small Arms Training	5.56, 7.62, 20 mm, 25 mm, 40 mm, .50 cal weapons	13 Days	18 Days	18 Days	Main Target Area MPMGR (Proposed)

Table 2-1: Current and Proposed Annual Level of Training and Testing Activities at NWSTF Boardman (continued)

Range Activity	Representative Platform	Annual Number of Training Events			Location
		No Action Alternative	Alternative 1	Alternative 2	
Mortar Firing	60 mm and 81 mm (using Full Range Practice Cartridge)	0	0	18	Main Target Area
Conduct Airborne Operations					
Night Vision Goggle Low-Level Training	EA-18G Growler, H-60, CH-47	48	48	48	Boardman MOA, Restricted Areas
Conduct Fire Support					
Convoy Live Fire Training	HMMWV, FMTV M1A2 Abrams, M2/M3 Bradley, Stryker M88 Wrecker	0	45 Days	45 Days	CLFR (Proposed)
Digital Multipurpose Training Range Training	HMMWV, LMTV/MTV, M113, M1A2, M2/M3, M88 Wrecker, Stryker CH-47	0	21 Days	0 Days	DMPTR (Proposed)
Multipurpose Machine Gun Range Training	HMMWV, Stryker (weapons systems would include M249 SAW, M240B, M60, M2, MK 19, Sniper rifles up to and including .50 cal)	0	117 Days	117 Days	MPMGR (Proposed)
Ordnance Disposal and Demolition					
Land Demolition Training	EOD personnel, ORNG Engineers	0	50	50	DTR (Proposed)

Notes: (1) mm = millimeters, MOA = Military Operations Area, MPTR = Multipurpose Training Range, TUAS = Tactical Unmanned Aircraft Systems, MPMGR = Multipurpose Machine Gun Range, CLFR = Convoy Live Fire Range, DMPTR = Digital Multipurpose Training Range, EOD = Explosive Ordnance Disposal, ORNG = Oregon National Guard, DTR = Demolition Training Range, FMTV = Family of Medium Tactical Vehicles—mostly 2.5-ton, LMTV = Light Medium Tactical Vehicle, and 5-ton MTV.

(2) All items are non-explosive practice munitions except for Demolition Training. (3) Platforms presented are representative platforms and other similar platforms could be used.

Table 2-2: Estimated Total Annual Munitions Use at NWSTF Boardman

Training Area and Munitions Type	Number of Rounds Per Year[1]		
	No Action	Alternative 1	Alternative 2
Practice/Training Munitions			
MK-76	392	392	392
MK-82	10	10	10
MK-83	3	3	3
MK-84	2	2	2
Laser-Guided Training Rounds	20	20	20
Mortar Rounds			
60 mm or 81 mm (non-explosive)	0	0	1,440
Tank Cannon Rounds			
120 mm (non-explosive)	0	700	0
Missiles			
TOW Missile (non-explosive)	0	35	0
Small and Medium Caliber Rounds			
5.56 mm	18,000	469,500	269,500
7.62 mm	12,000	813,000	333,000
20 mm	26,000	88,800	88,800
25 mm	0	20,000	20,000
40 mm	250	58,500	10,500
.50 caliber	1,000	252,000	102,000
High Explosive Charges			
200 pounds net explosive weight or less	0	50	50

[1] Values are based on historical use, existing requirements, and anticipated future requirements. These values are representative of baseline (No Action Alternative) and anticipate future (Alternatives 1 and 2) range use, and are presented for analysis purposes. Actual values will vary based on specific training requirements, which are influenced by factors such as deployments and world events.

Notes: (1) All items are non-explosive practice munitions except for Demolition Training. (2) mm = millimeters; TOW = Optically Tracked, Wire-Guided Missile

Table 2-3: Summary of Estimated Annual Munitions Use by Range Area

Training Area and Munitions Type	Number of Rounds Per Year[1]		
	No Action	**Alternative 1**	**Alternative 2**
Main Target Area (includes strafing pit)			
Practice/Training Munitions			
MK-76	392	392	392
MK-82	10	10	10
MK-83	3	3	3
MK-84	2	2	2
Laser-Guided Training Rounds	20	20	20
Total	**427**	**427**	**427**
Mortar Rounds			
60 mm or 81mm (non-explosive)	0	0	1,440
Total	**0**	**0**	**1,440**
Small and Medium Caliber Rounds			
5.56 mm	18,000	19,500	19,500
7.62 mm	12,000	13,000	13,000
20 mm	26,000	88,800	88,800
40 mm	250	500	500
.50 caliber	1,000	2,000	2,000
Total	**57,250**	**123,800**	**123,800**
Multipurpose Machine Gun Range			
Small and Medium Caliber Rounds			
5.56 mm	0	160,000	160,000
7.62 mm	0	220,000	220,000
.50 caliber	0	75,000	75,000
Total	**0**	**455,000**	**455,000**
Digital Multipurpose Training Range			
Tank Cannon Rounds			
120 mm (non-explosive)	0	700	0
Missiles			
TOW Missile (non-explosive)	0	35	0
Small and Medium Caliber Rounds			
5.56 mm	0	200,000	0
7.62 mm	0	480,000	0
25 mm	0	20,000	0
40 mm	0	48,000	0
.50 caliber	0	150,000	0
Total	**0**	**898,735**	**0**

Table 2-3: Estimated Annual Munitions Use by Range Area (continued)

Training Area and Munitions Type	Number of Rounds Per Year[1]		
	No Action	Alternative 1	Alternative 2
Convoy Live Fire Range (Eastern)			
Small and Medium Caliber Rounds			
5.56 mm	0	90,000	45,000
7.62 mm	0	100,000	50,000
40 mm	0	10,000	5,000
.50 caliber	0	25,000	12,500
Total	**0**	**225,000**	**112,500**
Convoy Live Fire Range (Western)			
Small and Medium Caliber Rounds			
5.56 mm	0	0	45,000
7.62 mm	0	0	50,000
40 mm	0	0	5,000
.50 caliber	0	0	12,500
Total	**0**	**0**	**112,500**
Demolition Training Range			
High Explosive Charges			
200 pounds net explosive weight or less	0	50	50
Total	**0**	**50**	**50**

[1] Values are based on historical use, existing requirements, and anticipated future requirements. These values are representative of baseline (No Action Alternative) and anticipate future (Alternatives 1 and 2) range use, and are presented for analysis purposes. Actual values will vary based on specific training requirements, which are influenced by factors such as deployments and world events.

Notes: mm = millimeters; TOW = Optically Tracked, Wire-Guided Missile

Table 2-4: Annual Estimates of Aircraft Overflights in the NWSTF Boardman Special Use Airspace

Aircraft	No Action Alternative				Alternative 1				Alternative 2			
	Sorties	Flight Time (Hours)	% Above 3,000 ft. MSL	% Nighttime	Sorties	Flight Time (Hours)	% Above 3,000 ft. MSL	% Nighttime	Sorties	Flight Time (Hours)	% Above 3,000 ft. MSL	% Nighttime
Fixed-Wing												
EA-6B Prowler	448	672	25%	1%	0	0	0%	0%	0	0	0%	0%
EA-18G Growler	201	302	35%	1%	1,348	2,791	35%	1%	1,348	2,791	35%	1%
F-15	60	120	65%	0%	60	120	65%	0%	60	120	65%	0%
F-16	5	8	35%	0%	5	8	35%	0%	5	8	35%	0%
F-35	0	0	0%	0%	64	126	35%	0%	64	126	35%	0%
FA-18	129	154	35%	0%	129	154	35%	0%	129	154	35%	0%
AV-8	4	6	35%	0%	0	0	0%	0%	0	0	0	0%
P-3/EP-3/P8	0	0	0%	0%	50	25	100	20	50	25	100	20
Parachute Drops from C-130, C-17, CH-47 or C-23	0	0	0%	0%	12	12	50%	20%	12	12	50%	20%
Total	**847**	**1,262**			**1,668**	**3,236**			**1,668**	**3,236**		
Helicopters												
CH-47 Chinook	54	81	0%	33%	65	97	0%	33%	65	97	0%	33%
UH-60 Blackhawk	18	27	0%	33%	22	32	0%	33%	22	32	0%	33%
UH-72 Lakota	0	0	0%	0%	6	8	0%	33%	6	8	0%	33%
Total	**72**	**108**			**93**	**137**			**93**	**137**		
Unmanned Aircraft Systems												
RQ-7 Shadow	52	104	-	15%	204	408	-	15%	204	408	-	15%
RQ-11 Raven	13	26	-	15%	30	100	-	15%	30	100	-	15%
SCANEAGLE	831	3754.9	85%	15%	1475	5,900	85%	15%	1475	5,900	85%	15%
Total	**896**	**3,884.9**			**1,709**	**6,408**			**1,709**	**6,408**		
GRAND TOTAL	**1,815**	**5,254.9**			**3,470**	**9,781**			**3,470**	**9,781**		

Notes: (1) Flight Time (Hours) = Total flight in NWSTF (Naval Weapons Systems Training Facility) Boardman Military Operating Area; % Above 3,000 ft. (914.4 m) MSL = estimated percentage of total flight time that occurs at an altitude above 3,000 ft. (914.4 m) above MSL; % nighttime = percentage of total flight time that occurs between 10 pm and 7 am.
(2) Flight Time in hours is a summation of all operations, which often occur concurrent to each other. The total flight hours are not a representation of sequential flight hours.
(3) The F-35 is not currently planned for basing with Navy units in the northwest; however, as with other military aircraft types, potential infrequent utilization of NWSTF Boardman is possible from transient units.
(4) MSL = mean sea level, ft. = feet, m = meter

Table 2-5: Summary of Proposed Range Enhancements – Alternatives 1 and 2

Proposed Range Enhancement	Total Area of Construction Disturbance (acres)			Total Area of Construction Disturbance (acres)
	Undisturbed Area (acres)	Previously Disturbed Area (acres)	Area Temporarily Disturbed and Revegetated (acres)	
Alternative 1				
MPMGR and Range Operations Control Area	16	0	14	30
DMPTR and Range Operations Control Area	25	0	15	40
CLFR (Eastern)	0	12	0	12
DTR	0	1	0	1
TUAS Training and Maintenance Facility	8	0	1	9
Drop Zone	0	0	0	0
TOTAL	**49**	**13**	**30**	**92**
Alternative 2				
MPMGR and Range Operations Control Area	16	0	14	30
CLFR (Eastern)	0	12	0	12
DTR	0	1	0	1
TUAS Training and Maintenance Facility	8	0	1	9
Drop Zone	0	0	0	0
Three Mortar Firing Points	0	0	0	0
CLFR (Western)	0	12	0	12
Joint-Use Range Operations Support Center	0.5	0	0	0.5
TOTAL	**24.5**	**25**	**15**	**64.5**

Notes: MPMGR = Multipurpose Machine Gun Range, DMPTR = Digital Multipurpose Training Range, CLFR = Convoy Live Fire Range, DTR = Demolition Training Range, TUAS = Tactical Unmanned Aircraft Systems

Table 2-6: Anticipated Schedule for Proposed Range Enhancements – Alternatives 1 and 2

Proposed Range Enhancement	Approximate Construction Duration (months)
Alternative 1	
MPMGR and Range Operations Control Area	18
DMPTR and Range Operations Control Area	12
CLFR (Eastern)	6
DTR	3
TUAS Training and Maintenance Facility	18
Drop Zone	n/a
Weapons Impact Scoring System	1
Alternative 2	
MPMGR and Range Operations Control Area	18
CLFR (Eastern)	6
DTR	3
TUAS Training and Maintenance Facility	18
Drop Zone	n/a
Weapons Impact Scoring System	1
Three Mortar Firing Points	1
CLFR (Western)	6
Joint-Use Range Operations Control Center	18

Notes: (1) MPMGR = Multipurpose Machine Gun Range, DMPTR = Digital Multipurpose Training Range, CLFR = Convoy Live Fire Range, DTR = Demolition Training Range, TUAS = Tactical Unmanned Aircraft Systems, n/a = Not Applicable
(2) The establishment of the Drop Zone does not require ground-disturbing activities.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

The Navy and ORNG evaluated a full range of alternatives using the screening criteria outlined in Section 2.2.1 (Alternatives Development) to identify reasonable alternatives that would be carried forward for analysis in this EIS. Pursuant to 40 C.F.R. §1502.14(a), the Navy and ORNG eliminated from further analysis the alternatives described in the following sections because they did not meet the purpose of and need for the Proposed Action or were not practical or feasible from a technical or economic standpoint.

2.6.1 CONSTRUCTING RANGE ENHANCEMENTS AND CONDUCTING TRAINING AT LOCATIONS OTHER THAN NWSTF BOARDMAN

As required by Department of the Army and National Guard Bureau polices, the ORNG has conducted a detailed analysis of alternative range locations to meet its training needs. A Range Development Plan, completed by a military planning firm for the ORNG in April 2000, identified the need to develop Army-standard training ranges that would accommodate live fire training and qualification for assigned weapon systems and vehicles (Oregon Military Department 2000). The ORNG then prepared a Land Use

Requirements Study that identified NWSTF Boardman as the only practical location in Oregon that could accommodate the proposed new training ranges (Oregon Military Department 2003). The Land Use Requirements Study looked at the development of needed weapons training ranges and concluded that construction of a MPMGR or DMPTR on existing ORNG installations was not possible and obtaining new lands through purchase or the Congressional withdrawal of public lands was not within the capability of the ORNG to implement.

NWSTF Boardman is a unique national range asset that derives its value from its training capabilities and its location close to Navy and ORNG training units. Factors that make NWSTF Boardman uniquely suited to its mission are discussed in Section 1.3.2 (The Strategic Importance of NWSTF Boardman). These attributes include:

- Proximity to the homeport of Navy units in the Pacific Northwest;
- Proximity to ORNG military units and their families (Army Regulation 350-2 for weekend drills states that travel time should not exceed a total of 25 percent of the planned training time);
- In addition to considering existing ORNG installations for construction of the ranges, the following military installations were considered:
  - Fort Lewis/Yakima Training Center, Washington – Joint Base Lewis-McChord, which now includes Fort Lewis and commands Yakima Training Center, completed an EIS in February 2011. The Proposed Action alternative selected in the EIS includes the construction of several new weapons training ranges, but also will significantly increase the number of Soldiers training each year at Fort Lewis and Yakima Training Center, in addition to the continued training of Washington Army National Guard and Army Reserve units (who, as in-state units, have higher scheduling priority). ORNG units are given low priority when scheduling facilities at Fort Lewis and Yakima Training Center because they are transient users. Implementation of the Joint Base Lewis-McChord EIS Record of Decision is expected to significantly increase the ORNG's and Navy's difficulty in scheduling required training at Fort Lewis and Yakima Training Center. Construction of additional weapons training ranges at Joint Base Lewis-McChord or Yakima Training Center is not a feasible option to enable required ORNG training because additional ranges would not provide increased access for ORNG units on either installation. ORNG training travel constraints also make the use of Joint Base Lewis-McChord and Yakima Training Center problematic.
  - Orchard Training Area, Idaho – Conducting all ORNG training at Orchard Training Area's existing ranges is not feasible because of ORNG training travel constraints and scheduling conflicts with the installation's primary users, the Idaho National Guard.
  - Umatilla Chemical Depot – The Navy and ORNG received comments during the EIS scoping process that Umatilla Chemical Depot should be considered as an alternative location for some of the proposed land ranges. Lands on Umatilla Chemical Depot that are possibly available for use or acquisition by ORNG do not have sufficient acreage to contain the SDZs of any of the proposed ranges.

The ORNG also accepted an offer of assistance from The Nature Conservancy to search for potential alternatives to NWSTF Boardman for the proposed training ranges. The results of the evaluation identified 18 sites, including State-owned lands, of which six were considered to be potentially viable upon initial identification. Each of the potential parcels shared several significant limitations as alternatives for possible development.

- Each of the parcels is owned by multiple landowners. The ORNG counted from four to more than 30 owners on individual parcels. The potential to acquire sufficient land for the proposed training ranges is expected to be low and would take many years to accomplish, if the owners were willing to sell. The State of Oregon is unable to afford the purchase of sufficient land for a training installation the size of NWSTF Boardman.
- National Guard Regulation 450-80 does not allow the use of federal funds for the purchase of private lands as part of a project for the construction of facilities, including ranges. Potential sites must be State-owned or controlled, currently licensed to the State, or currently under the control of a federal military department or other federal agency.
- All of the parcels appear to contain State or county roads and other rights-of-way or easements that would need to be vacated and the improvements abandoned or relocated, which could be a potentially controversial, lengthy, and expensive process. Some of the parcels have more than 30 roads traversing them.
- Acquired land would need to be rezoned for military training use, which could be a lengthy and controversial process.
- Each of the parcels contains a varying number of structures, such as buildings, dams, and wind-powered electrical generation towers, which would likely need to be removed or demolished at considerable expense. A selected parcel would require on-site operations and maintenance personnel. Many of the suggested parcels are too remote to allow ORNG to station personnel within a reasonable distance.
- NWSTF Boardman is overlain by the only Federal Aviation Administration (FAA)-designated Restricted Area in Oregon. The FAA would need to establish an appropriate Restricted Area if any of the proposed ranges are located at a site other than on NWSTF Boardman, a lengthy rulemaking and acquisition process that is longer than the MOA establishment process (JO 7400.2) which would not meet the existing training needs schedule. The restricted area floor may be established to the surface only when the using agency owns, leases, or by agreement, controls the underlying surface. Existing restricted areas established from the surface before December 1, 1967, are exempt from the “own, lease, or control” requirement.

The Navy also conducted an analysis of alternative locations for current and required future training activities and determined that NWSTF Boardman and associated special use airspace is the only practical alternative. Currently, the NWSTF Boardman special use airspace is the only airspace in the western United States that affords EA-6B Prowler and EA-18G Growler aircrews that conduct the Airborne Electronic Attack mission the ability for LATT and Surface-to-Air Counter-Tactics Training. LATT requires flight at altitudes as low as 200 ft. (61.01 m) AGL. It is preferable that these flights occur in a Restricted Area due to the Visual Flight Rules traffic restrictions and lower elevation restrictions. Integrating the EA-6B Prowler and EA-18G Growler aircrews’ training requirements into the schedules of other DoD ranges or airspace would be exceptionally challenging because these squadrons deploy on unique schedules and each aircrew has unique range training needs depending on experience and proficiency of the individuals and their performance during training scenarios. Furthermore, no other ranges or airspace currently have the capacity to support the additional sorties that are required to meet the purpose of and need for the Proposed Action (see Table 2-1 and Table 2-4). Following is a summary of the Navy’s analysis of alternative training locations:

- NAS Fallon and Fallon Range Training Complex, Nevada is currently at 95 percent capacity and the remaining capacity is expected to be used for emergent requirements.

- The Restricted Area 2508 complex at Naval Air Weapons Station China Lake, California is a Naval Air Systems Command range with a RDT&E mission priority. This range is unable to support the required throughput due to exclusive use limitations.
- The range at Naval Air Facility El Centro, California is dedicated for Blue Angel and Fleet Replacement Squadron training. The small Surface-to-Air Counter-Tactics training area precludes EA-6B Prowler and EA-18G Growler aircrew training and capacity is not adequate to meet throughput requirements.
- Nellis Air Force Base, Nevada is at full capacity.
- Restricted Area 6714 at the Army's Yakima Training Center, Washington is too small (half the length of Restricted Area 5701 at NWSTF Boardman) and too mountainous to accommodate LATT and Surface-to-Air Counter-Tactics Training. In addition, the Army frequently conducts artillery training in Restricted Area 6714, which precludes low-altitude flights.
- Okanogan and Roosevelt MOAs, Washington have floors of 300 ft. (91.4 m) AGL and are not restricted airspace. In addition, the terrain is too mountainous to conduct LATT and Surface-to-Air Counter-Tactics Training.
- Olympic MOA, Washington has a floor of 6,000 ft. (1,828.8 m) MSL and is not restricted airspace.
- Owyhee MOA, Idaho is 450 nm away from NAS Whidbey Island, is not restricted airspace, and does not support LATT and Surface-to-Air Counter-Tactics Training due to terrain.
- Juniper Low MOA, Oregon has a floor of 300 ft. (91.4 m) AGL, is not restricted airspace, and does not support LATT and Surface-to-Air Counter-Tactics Training due to terrain.

The Navy determined that use of any of the areas listed above would not be a practical alternative to establishing the new MOA proposed under Alternative 2 (see Figure 2-5). While the proposed MOAs would not be a Restricted Area and the floor would be 500 ft. (152.4 m) AGL, it would abut Restricted Area 5701. Aircrews could accomplish the 200 ft. (61.01 m) AGL flight requirement in Restricted Area 5701 and complete other aspects of LATT Training and Surface-to-Air Counter-Tactics Training in the contiguous airspace provided by the proposed MOAs. Use of airspace that is not adjacent to Restricted Area 5701 to accomplish portions of LATT and Surface-to-Air Counter-Tactics Training is not practical and would not meet the purpose of and need for the Proposed Action.

In summary, the Navy and ORNG used objective criteria to evaluate an exhaustive list of alternative range locations. None of the alternative range locations are feasible or meet the purpose of and need for the Proposed Action. Therefore, alternative range locations are not considered reasonable alternatives and are not carried forward for further analysis in this EIS.

2.6.2 SIMULATED TRAINING

Military training includes extensive use of computer-simulated virtual training environments, and involves command and control exercises without operational forces (constructive training). These training methods have substantial value in achieving limited training objectives. Computer technologies provide excellent tools for implementing a successful, integrated training program while reducing the risk and expense typically associated with live military training. However, virtual and constructive training are an adjunct to, not a substitute for, live training, including live fire training. Unlike live training, simulated training does not provide the requisite level of realism necessary to attain combat readiness, and cannot replicate the high-stress environment encountered during combat operations.

Current simulation technology does not permit training with the degree of fidelity required to maintain proficiency. Basic training can take place using simulators but, beyond basic levels, simulation is of limited utility as the simulator cannot match the dynamic nature of the environment. Specifically, coordinated unit level activities require multiple crews to interact in a variety of environments that cannot be simulated. Moreover, it is a training imperative that crews actually use the weapons and equipment they will be called upon to operate.

Aviation simulation training has provided valuable training for aircrews in specific limited training situations. However, the numerous variables that affect the outcome of any given training flight cannot be simulated with a high degree of realism. The military continues to research new ways to provide realistic training through simulation, but there are limits to realism that simulation can provide, most notably in dynamic multi-threat environments involving numerous forces, and where the training media is too complex to accurately model.

This alternative—substitution of simulation for live training—fails to meet the purpose of and need for the Proposed Action, and was therefore eliminated from detailed study.

2.6.3 Reduction in the Level of Current Training at Naval Weapons Systems Training Facility Boardman

The U.S. Armed Services' (Army, Navy, Air Force, Marine Corps, and reserve components) requirements for training have been developed over many years to ensure their personnel achieve and maintain levels of readiness so they are properly prepared for operational success. The Services have identified training requirements to acquire warfighting proficiency. There is no "extra" training built into the training program. Any reduction of training would not allow the Services to achieve satisfactory levels of proficiency and readiness required to accomplish assigned missions. For this reason, alternatives that would reduce training would not meet the purpose and need of the proposal, and therefore were eliminated from further study and analysis.

2.6.4 Constructing Range Enhancements and Conducting Training within Alternative Locations on Naval Weapons Systems Training Facility Boardman

Prior to the development of this EIS, the ORNG prepared a Land Use Requirements Study for NWSTF Boardman in December 2003. As part of that effort, the Land Use Requirements Study considered alternative management actions that could provide the live fire weapons training facilities needed by ORNG units. The Land Use Requirements Study did not identify any actions other than the development of training ranges on NWSTF Boardman that would substantially remedy identified in-state, live fire, weapons training facility shortfalls within current Army requirements.

Development of alternatives for the proposed CLFR locations at NWSTF Boardman considered using existing roads as much as possible to reduce development costs and potential adverse environmental effects. Placement of the CLFR was designed so that both could be operated simultaneously or one CLFR could be operated while either the MPMGR or the DMPTR was in operation, and containment of the SDZ for the CLFRs was within the boundaries of NWSTF Boardman. The use of existing roads and jeep trails nearer to the center of NWSTF Boardman was considered but rejected. Use of these roads would not be practicable because they are within the SDZ for both the DMPTR and the MPMGR and CLFRs along these roads could not be operational when either of the training ranges was in operation. A longer CLFR route along the eastern side of NWSTF Boardman was considered but rejected because it would require additional road construction and would enter areas of Juniper Canyon that contain higher value wildlife habitat. Therefore, the CLFRs were placed along existing roads resulting in no new ground disturbance due to construction of either CLFR (see Table 2-5). Co-location of the MPMGR and a heavy sniper range was considered and is being proposed. Although the MPMGR and DMPTR range footprints could not be shared, the locations of these ranges are proposed to be as close to one another as possible, so their respective SDZs overlap one another as much as possible. All of these measures have reduced the footprint of new permanent ground disturbance from the Proposed Action as much as possible to accommodate habitat and species concerns.

Space requirements for the proposed weapons training ranges and their associated SDZs and the shape and size of NWSTF Boardman installation restrict the potential locations of those ranges. The proposed sites for the weapons training ranges were located as far north as possible to avoid known cultural and historical resources in the southern portion of the installation and areas believed to be more valuable wildlife habitat. Also, the ranges were located south of the main east-west road across the installation so weapons firing would not occur across the road and preclude the necessity of constructing a new main east-west road farther to the north, in an effort to reduce the proposed new permanent ground disturbing activities. The proposed UAS facility is proposed to be located in flat terrain, as far from existing wind farm developments as possible and outside of the weapons training range SDZs.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.0 INTRODUCTION

This chapter describes existing environmental conditions (affected environment) for resources potentially affected by the alternatives described in Chapter 2 (Description of Proposed Action and Alternatives). Potential biological, physical, cultural, and social resource impacts (environmental consequences) are identified, described, and evaluated for the alternatives. Due to the concerns regarding wildfire, and the frequency of fires in the region, the potential for wildfire as a result of military activities at Naval Weapons Systems Training Facility (NWSTF) Boardman is addressed in its own resource category. As discussed in Chapter 2, training activities would continue at current levels under the No Action Alternative. In accordance with Council on Environmental Quality regulations (40 Code of Federal Regulations [C.F.R.] §1502.14[d]), analysis of the No Action Alternative is required to provide a baseline against which the effects of a proposed action and all other alternatives can be compared. The No Action Alternative analyzed in this Environmental Impact Statement (herein referred to as EIS) involves continuing military training and testing activities at NWSTF Boardman at regular and historic levels. No range enhancements would be made under the No Action Alternative and no new airspace would be established. The potential impacts of the No Action Alternative are compared to the potential impacts of activities proposed under Alternative 1 and Alternative 2.

The affected environment and environmental consequences are described and analyzed according to 13 resource categories. The resource categories and their sections in this EIS are as follows:

- Soils (3.1)
- Air Quality (3.2)
- Water Quality (3.3)
- Noise (3.4)
- Vegetation (3.5)
- Wildlife (3.6)
- Land Use and Recreation (3.7)
- Socioeconomics and Environmental Justice (3.8)
- Transportation (3.9)
- Cultural Resources (3.10)
- American Indian Traditional Resources (3.11)
- Public Health and Safety and Protection of Children (3.12)
- Wildfire (3.13)

As mentioned in Section 1.1 (Introduction), since the proposed action contemplates activities associated with special use airspace (SUA), the United States Department of the Navy (Navy) requested the Federal Aviation Administration's (FAA's) cooperation (January 10, 2012, Appendix B) in accordance with the guidelines described in the Memorandum of Understanding between the FAA and the Department of Defense (DoD) concerning SUA Environmental Actions, dated October 4, 2005. In addition to the Navy's policies and procedures for addressing the National Environmental Policy Act (NEPA), the FAA similarly follows policies and procedures to ensure compliance with NEPA as described in FAA Order 1050.1. The FAA has identified 18 impact categories that it examines for most of its actions. Many of the FAA impact categories are interrelated and are discussed under multiple resource categories as defined above. Table 3.0-1 presents the FAA Impact Category, as well as where it is addressed within this EIS. If the proposed action and its alternatives will not cause impacts within specific FAA impact categories, a brief statement describing the basis for that conclusion is presented within Table 3.0-1, and this impact category is not carried further in the analysis within this Final EIS.

Table 3.0-1: FAA Impact Categories and EIS Categories

FAA Impact Category	EIS Resource Category Where Addressed	NOTES
Air Quality	Air Quality (3.2)	
Biological Resources (includes Fish, Wildlife, and Plants	Vegetation (3.5) Wildlife (3.6)	Fish are not addressed in this EIS, as there are no habitats in the ROI that support fish. Military training activities proposed under the Action Alternatives do not overlap with habitats that support aquatic life.
Climate	Climate Change (4.5)	
Coastal Resources	n/a	Coastal Resources are not addressed in this EIS as the ROI is geographically separated from coastal areas.
Department of Transportation Act, Section 4(f)	n/a	EIS does not require the use of publicly owned land off a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of an historic site of national, State, or local significance
Farmlands	Soils (3.1) Vegetation (3.5) Land Use and Recreation (3.7) Socioeconomics and Environmental Justice (3.8)	
Hazardous Materials, Pollution Prevention, and Solid Waste	Soils (3.1) Air Quality (3.2) Water Quality (3.3)	
Historical, Architectural, Archeological, and Cultural Resources	Cultural Resources (3.10) American Indian Traditional Resources (3.11)	Designation of airspace for military flight operations is exempt from section 4(f). The National Defense Authorization Act for Fiscal Year 1998 (Public Law 105-85) provided that "[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of section 303(c) of title 49, United States Code.
Land Use	Land Use and Recreation (3.7)	

Table 3.0-1: FAA Impact Categories and EIS Categories (continued)

FAA Impact Category	EIS Resource Category Where Addressed	NOTES
Natural Resources and Energy Supply	n/a	The use of natural resources other than for fuel needs to be examined only if the action involves a need for unusual materials or those in short supply. The Proposed Action would have no effect on natural resources of the area and energy supplies other than routine consumption of fossil fuels during construction and military readiness activities.
Noise and compatible land use	Noise (3.4)	Designation of airspace for military flight operations is exempt from section 4(f). The National Defense Authorization Act for Fiscal Year 1998 (Public Law 105-85) provided that "[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of section 303(c) of title 49, United States Code.
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks	Socioeconomics and Environmental Justice (3.8) Public Health and Safety and Protection of Children (3.12)	
Visual Effects (including Light Emissions)	Cultural Resources (3.10) American Indian Traditional Resources (3.11)	While visual impacts are discussed in the EIS, light emissions will be negligible and are geographically separated from areas adjacent to public use of lands, thus minimizing the possibility of annoyance from light emissions.
Water Resources (including wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers)	Water Quality (3.3)	No year-round surface waters occur on NWSTF Boardman. The only natural surface water occurs as rainfall runoff, creating intermittent flows in Juniper and Well Springs canyons on the south end of NWSTF Boardman. Planning level surveys determined that wetlands do not exist at NWSTF Boardman and hydric soils (soil that formed under conditions of saturation, flooding or ponding) are not present.

Notes: EIS = Environmental Impact Statement, FAA = Federal Aviation Administration, n/a = Not Applicable, NWSTF = Naval Weapons Systems Training Facility, ROI = Region of Influence

With regards to FAA Impact Categories, Compatible Land Use and Historical, Architectural, Archeological, and Cultural Resources: Designation of airspace for military flight operations is exempt from section 4(f). The National Defense Authorization Act for Fiscal Year 1998 (Public Law 105-85) provided that "[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of section 303(c) of Title 49, United States Code."

During the environmental impact analysis process, the resources analyzed are identified and the expected geographic scope of potential impacts for each resource is defined. Known as the resource's Region of Influence (ROI), this area is defined as the geographic area in which impacts to the subject resource have the potential to occur. For the majority of resource categories, the ROI coincides with the air and land training areas of NWSTF Boardman. For some resources, the ROI encompasses broader regions.

Describing the environment and analyzing impacts requires a comprehensive and systematic review of relevant literature and data to ensure only the best available information is used for analysis. Section 3.0.1 (Data Sources and best Available Data) describes what data were used and the characteristics of the best available data.

The overall approach to analysis is provided in Section 3.0.2 (General Approach to Analysis). This section describes how the Proposed Action is broken down into stressors that are analyzed for each resource. It provides a general analysis framework, preliminary impact screening, resource-specific individual stressor analysis, synthesis of ecosystem effects of the Proposed Action, and introduction to cumulative impacts analysis.

This chapter concludes by assessing impacts to physical resources, biological resources, and human resources (Sections 3.1 through 3.13). Each resource section has a more focused description of the regulatory framework applicable to that resource, a more focused approach to analysis, a discussion of the affected environment of that resource, the environmental consequences of the Proposed Action and alternatives, a summary of the impacts to that resource, and the regulatory determination of impacts to that resource.

In determining environmental consequences, this chapter incorporates current resource protection measures such as standard operating procedures, management practices (MPs), and conservation measures that are integral to the activities covered by the Proposed Action and its Alternatives. If the analysis in a resource section identifies a potential impact to the resource from the Proposed Action, methods are proposed that would minimize or mitigate the potential impacts identified. These mitigation measures are discussed at the end of each resource section and summarized in Chapter 5 (Management Practices, Monitoring, and Mitigation Measures).

3.0.1 Data Sources and Best Available Data

A systematic review of relevant literature, regulatory requirements, mitigation provisions, and data was conducted to complete the technical and compliance analysis for each resource category. Both published and unpublished documents were used, including journals, books, periodicals, bulletins, DoD operations reports, theses, dissertations, endangered species recovery plans, species management plans, and other technical reports published by government agencies, private businesses, or consulting firms.

3.0.2 General Approach to Analysis

The EIS interdisciplinary team composed of Navy and National Guard subject matter experts used a screening process to analyze training activities to identify specific activities in the alternatives that could act as stressors to resources. Other information that was evaluated to identify and analyze stressors included public and agency scoping comments, previous environmental analyses, agency consultations, resource-specific information, and applicable laws, regulations, and executive orders. This process was used to focus the information presented and analyzed in the affected environment and environmental consequences sections of this EIS. Table 3.0-2 summarizes range activities, the number of yearly training activities that would be associated with each alternative, and the stressors that potentially would occur related to those activities. The proposed training activities were evaluated to identify specific components that could act as stressors by having direct or indirect impacts on the environment. Matrices were prepared to identify associations among stressors, resources, training activities, and alternatives (Table 3.0-2 and Table 3.0-3). Stressors for human resources (land use and recreation, socioeconomic resources, transportation, cultural resources, traditional treaty rights, and public health and safety) are presented under “Other” in Table 3.0-3.

The stressors and some of the activities that could cause them include:

- Noise (Fixed-Wing Aircraft Noise, Helicopter Noise, Range Noise [Small Arms Firing, Large Arms Firing, Impulsive/Land Demolition], Non-explosive Practice Munitions Impact Noise, Vehicle/Equipment Noise, Construction Noise)
- Physical Strikes (Non-explosive Practice Munitions, Vehicle/Equipment, or Aircraft [Collisions with Organisms/Habitat])
- Ground Disturbing Activities or Alteration of Habitat (Construction, Military Training Activities, Maintenance Activities, Training-related Wildfire, Invasive Plants)
- Energy (Electromagnetic Radiation, Lasers)
- Air Pollutant Emissions (Criteria Air Pollutant Emissions, Hazardous Air Pollutant Emissions, Fugitive Dust Emissions)
- Potential Release of Soil or Water Contaminants (Incidental Spills, Non-Explosive Practice Munitions, Domestic Wastewater Treatment and Disposal)
- Other (Groundwater Withdrawal, Air Activities, Land Activities)

Table 3.0-2: Range Activities and Potential Stressors

Range Activity	Location	Annual Number of Training Events[1]			Stressors						
		No Action Alternative	Alternative 1	Alternative 2	Noise	Physical Strike	Ground Disturbing Activities/Alteration of Habitat	Energy	Air Pollutant Emissions	Release of Soil or Water Contaminants	Other
Construction of Range Elements	Rangewide	n/a	n/a	n/a	✓	✓	✓		✓		✓
Air Warfare											
Surface-to-Air Counter Tactics and Low Altitude Tactical Training	Boardman MOA, Boardman MOA (proposed extension) Boardman Low MOA (proposed) Restricted Areas	257	1,047	1,047	✓	✓			✓		✓

Table 3.0-2: Range Activities and Potential Stressors (continued)

Range Activity	Location	Annual Number of Training Events[1]			Stressors						
		No Action Alternative	Alternative 1	Alternative 2	Noise	Physical Strike	Ground Disturbing Activities/Alteration of Habitat	Energy	Air Pollutant Emissions	Release of Soil or Water Contaminants	Other
Strike Warfare											
Air-to-Ground Bombing Exercise	Main Target Area	133	133	133	✓	✓	✓	✓	✓	✓	✓
Air-to-Ground Gunnery Exercise	Main Target Area, Strafe Pit, DMPTR (proposed)	20	70	70	✓	✓	✓	✓	✓	✓	✓
Air-to-Ground Missile Exercise/High Speed Anti-Radiation Missile Exercise (non-firing)	Main Target Area, Boardman MOA, Restricted Areas	65	180	180	✓	✓		✓	✓	✓	✓
Intelligence, Surveillance, and Reconnaissance	Boardman MOA, Restricted Areas	9	9	9	✓	✓					✓
Electronic Warfare											
Chaff and Electronic Attack and Electronic Support	Boardman MOA, Restricted Areas	193	500	500	✓	✓		✓	✓		✓
Support Activities											
Unmanned Aircraft Systems/Tactical Unmanned Aircraft Systems Operations	TUAS Airfield, R-5701 (all), R-5706	896	1,709	1,709	✓	✓			✓		✓
Insertion and Extraction	Drop Zone (Proposed)	0	12 Days	12 Days	✓	✓	✓[2]		✓		✓
Small Arms Training	Main Target Area, MPMGR (Proposed)	13 Days	18 Days	18 Days	✓	✓	✓		✓	✓	✓
Mortar Firing	Main Target Area	0	0	18	✓	✓	✓[2]		✓	✓	✓
Conduct Airborne Operations											
Night Vision Goggle Low-Level Training	Boardman MOA, Restricted Areas	48	48	48	✓	✓		✓	✓		✓
Conduct Fire Support											
Convoy Live Fire Training	CLFR (Proposed)	0	45 Days	45 Days	✓	✓	✓		✓	✓	✓
DMPTR Training[3]	DMPTR (Proposed)	0	21 Days	0	✓	✓	✓	✓	✓	✓	✓
Multipurpose Machine Gun Range Training[4]	MPMGR (Proposed)	0	117 Days	117 Days	✓	✓	✓		✓	✓	✓

Table 3.0-2: Range Activities and Potential Stressors (continued)

Range Activity	Location	Annual Number of Training Events[1]			Stressors						
		No Action Alternative	Alternative 1	Alternative 2	Noise	Physical Strike	Ground Disturbing Activities/Alteration of Habitat	Energy	Air Pollutant Emissions	Release of Soil or Water Contaminants	Other
Ordnance Disposal and Demolition											
Explosive Demolition Training	DTR (Proposed)	0	50	50	✓		✓		✓	✓	✓

[1] Annual number of events unless noted otherwise
[2] While there will be no ground disturbing construction activities, personnel will still be present at these locations, thus potentially disturbing the area
[3] Vehicle-mounted, crew-served weapons and helicopter door gunnery training and qualification
[4] Crew-served machine gun and sniper rifle training and qualification

Notes: MOA = Military Operations Area, MPTR = Multipurpose Training Range, TUAS = Tactical Unmanned Aircraft Systems, MPMGR = Multipurpose Machine Gun Range, DMPTR = Digital Multipurpose Training Range, CLFR = Convoy Live Fire Range, DTR = Demolition Training Range, n/a = not applicable

3.0.2.1 Resources and Issues Evaluated

Physical resources and issues evaluated include soils, water quality, and air quality. Biological resources (including threatened and endangered species) evaluated include, but are not limited to mammals, birds (including migratory birds), and vegetation. Human resources evaluated in this EIS include land use, cultural resources, socioeconomics, and public health and safety. The methods used in this EIS to assess resource impacts associated with the proposed alternatives include the procedural steps outlined below:

1. Describe existing resource conditions.
2. Review existing federal and state regulations and standards relevant to resource-specific management and/or protection.
3. Identify critical resource conditions or areas that require specific analytical attention, such as designated listed species critical habitat.
4. Analyze the activities to determine what stressors may affect the particular resource.
5. Review and analyze data sources for information on stressor impacts to the resource, including modeling efforts and scientific research.
6. Determine specific impacts to the resource associated with the stressors that could result from Navy and Guard activities.
7. Adjust initial impact determinations to account for use of standard operating procedures, MPs, and other mitigation measures.
8. Determine overall impacts to the resource associated with the Proposed Action and Alternatives, given the applicable regulatory framework.
9. Summarize impact findings with respect to resource effects and compliance with applicable laws, regulations, and Navy and National Guard Bureau policies for each alternative.

Additional steps may be added to some resource evaluations to address unique resource characteristics or specific regulatory and public-issue concerns.

3.0.2.2 Resource-Specific Effects Analysis for Stressors

The direct and indirect effects of each stressor carried forward for further analysis were analyzed for each resource. Quantitative and semi-quantitative methods were used to the extent possible, but inherent scientific limitations required the use of qualitative methods for most stressor/resource interactions. Resource-specific methods are described in respective sections of Chapter 3, where applicable. While specific methods used to analyze the effects of individual stressors varied by resource, the following generalized approach was used for all stressor/resource interactions:

- The frequency, duration, and spatial extent of exposure to stressors were analyzed for each resource. The frequency of exposure to stressors or frequency of a proposed activity was characterized as intermittent or continuous, and was quantified in terms of number per unit of time when possible. Duration of exposure was expressed as short- or longer-term, and was quantified in units of time (seconds, minutes, hours, etc.) when possible. The spatial extent of exposure was generally characterized as widespread or localized, and the stressor footprint or area (e.g., square feet, square kilometers) was quantified when possible.
- An analysis was conducted to determine whether and how resources are likely to respond to stressor exposure or be altered by stressor exposure based upon available scientific knowledge. This step included reviewing available scientific literature and empirical data. For many stressor/resource interactions, a range of likely responses or endpoints was identified. For example, exposure of an organism to sound produced by an explosion could result in no response, a physiological response such as increased heart rate, a behavioral response such as being startled, or injury or mortality.
- The information obtained from the first two bullet points was used to analyze the likely effects of individual stressors on a resource and to characterize the type, duration, and intensity (severity) of effects. The type of effect was generally defined as beneficial or adverse, and further defined as a specific endpoint (e.g., change in behavior, mortality, change in concentration, loss of habitat, etc.). When possible, the endpoint was quantified. The duration of an effect was generally characterized as short-term (e.g., minutes, days, weeks, months, depending on the resource), long-term (e.g., months, years, decades, depending on the resource), or permanent. For biological resources, the analysis started with individual organisms and their habitats, and then addressed populations, species, and communities, as appropriate. All of the above information was analyzed to make a significance determination for each resource individually.

Table 3.0-3: Stressors Analyzed for Each Resource Category or Impact Topic

Stressor	Resource Category or Impact Topic												
	Soils	Air Quality	Water Quality	Noise	Vegetation	Wildlife	Land Use and Recreation	Socioeconomics and Env. Justice	Transportation	Cultural Resources	American Indian Traditional Resources[1]	Public Health and Safety	Wildfire
Noise													
Aircraft Noise (Fixed-wing)				✓		✓				✓			
Aircraft Noise (Helicopter)						✓				✓			
Range Noise (Small Arms Firing)				✓		✓				✓			
Range Noise (Large Arms Firing)				✓		✓				✓			
Range Noise (Impulsive / Land Demolition)						✓				✓			
Non-explosive Practice Munitions Impact Noise						✓				✓			
Vehicle/Equipment Noise				✓		✓				✓			
Construction Noise				✓									
Physical Strikes													
Non-explosive Practice Munitions Strikes						✓				✓			
Vehicle/Equipment Strikes						✓				✓			
Aircraft Strikes						✓							
Ground Disturbing Activities and Alteration of Habitat													
Construction Activities	✓	✓	✓		✓	✓				✓			✓
Military Training Activities	✓	✓	✓		✓	✓				✓			✓
Maintenance Activities	✓	✓	✓		✓	✓				✓			
Training-related Wildfire	✓				✓	✓							✓
Invasive Plants					✓	✓							
Energy													
Electromagnetic Radiation						✓						✓	
Lasers						✓						✓	
Air Pollutant Emissions													
Criteria Air Pollutant Emissions		✓											
Hazardous Air Pollutant Emissions		✓											
Fugitive Dust Emissions		✓											
Potential Release of Soil or Water Contaminants													
Incidental Spills	✓		✓										
Non-Explosive Practice Munitions	✓		✓										
Domestic Wastewater Treatment and Disposal			✓										

Table 3.0-3: Stressors Analyzed for Each Resource Category or Impact Topic (Continued)

<table>
<tr><th rowspan="2">Stressor</th><th colspan="13">Resource Category or Impact Topic</th></tr>
<tr><th>Soils</th><th>Air Quality</th><th>Water Quality</th><th>Noise</th><th>Vegetation</th><th>Wildlife</th><th>Land Use and Recreation</th><th>Socioeconomics and Env. Justice</th><th>Transportation</th><th>Cultural Resources</th><th>Tribal Treaty Rights[1]</th><th>Public Health and Safety</th><th>Wildfire</th></tr>
<tr><td colspan="14">Other</td></tr>
<tr><td>Groundwater Withdrawal</td><td></td><td></td><td>✓</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Air Activities</td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td><td rowspan="2">✓</td><td>✓</td><td></td><td rowspan="2">✓</td><td>✓</td><td></td></tr>
<tr><td>Land Activities</td><td></td><td></td><td></td><td></td><td></td><td></td><td>✓</td><td>✓</td><td></td><td>✓</td><td></td></tr>
</table>

[1]Tribal Treaty Rights are not included in the stressor-based analysis

3.0.2.3 Cumulative Impacts

A cumulative impact is the impact on the environment that results when the incremental impact of the action is added to other past, present, and reasonably foreseeable future actions. The cumulative impacts analysis (Chapter 4) considers other actions regardless of what agency (federal or non-federal) or person undertakes the actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 C.F.R. §1508.7). The goal of the analysis is to provide the decision makers with a “big picture” view of the effects on the future sustainability of important resources, not only of the proposed action and alternatives, but all other actions occurring within the same geographic region.

Similar to the resource-specific combined effects analysis described above, the cumulative impact analysis considered additive, synergistic, and antagonistic effects in relation to past, present, and reasonably foreseeable actions. The following process was used to identify the cumulative impacts of the Proposed Action and alternatives.

1. Other past, present, and reasonably foreseeable future actions that have affected, or will affect, the same resources as the proposed action were identified through the scoping process, communications with other agencies, a review of other military activities, literature review, and previous NEPA analyses. Individual actions were grouped to the extent possible so that the cumulative impacts analysis could focus on aggregate effects of the actions.
2. The effects of past, present, and reasonably foreseeable future actions on each resource were identified and summarized. Available information concerning the effects of other actions was derived from existing NEPA documents, the literature, and best professional judgment.
3. The incremental effects of each alternative were analyzed to determine if a significant cumulative effect would occur when added to the effects of past, present, and reasonably foreseeable actions.

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3.1 SOILS

3.1.1 INTRODUCTION

3.1.1.1 Overview

Soil is the unconsolidated mineral or organic material on the top layer of the Earth that serves as a natural medium for the growth of plants. Together with climate, soils largely determine the type of plants that can grow in an area. Proposed activities that could directly affect soils are limited to the land area of Naval Weapons Systems Training Facility (NWSTF) Boardman. Soils in areas adjacent to NWSTF Boardman could be indirectly affected by wind-transported soils. Therefore, the study area for soils includes NWSTF Boardman and adjacent areas that could be affected by wind-transported soils. The Boardman Low Military Operations Area proposed under Alternatives 1 and 2 would have no impact on soils because activities would be limited to aircraft overflights. Therefore, soils in this area are not discussed further. In addition to addressing soils, this section includes brief descriptions of geology and topography. Potential impacts on geology and topography would be negligible, and do not warrant detailed analysis. Nonetheless, general descriptive information is provided to support the overall description of the affected environment and the impact analysis for other resources.

3.1.1.2 Regulatory Framework and Navy Policy

3.1.1.2.1 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (42 United States [U.S.] Code [U.S.C.] §6901, et seq.) gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also sets forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled the U.S. EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

3.1.1.2.2 Farmland Protection Policy Act

The Farmland Protection Policy Act (FPPA) (7 U.S.C. §4201, et seq.) is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that, to the extent possible, federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency (Natural Resources Conservation Service 2012).

For the purpose of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance, which are defined based on soils. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land (Natural Resources Conservation Service 2012).

U.S. Department of the Navy (Navy) safety policies preclude the use of NWSTF Boardman for agricultural use; however, some of the soils on NWSTF Boardman are classified as prime farmland or farmland of statewide significance based on soils data from the Natural Resources Conservation Service. Potential impacts to these soils are analyzed in this section in accordance with the FPPA.

3.1.1.2.3 Range Sustainability Environmental Program Assessment

A critical aspect in ensuring the long-term sustainability of military ranges is to understand the environmental conditions at each range and to conscientiously manage these resources in an environmentally sound manner. The Range Sustainability Environmental Program Assessment (RSEPA) process is the Navy's approach for assessing and addressing the environmental condition of land-based operational ranges where munitions are used or were used, excluding small arms ranges, within the United States and its territories. Range Sustainability Environmental Program Assessment complies with the environmental requirements of the U.S. Department of Defense (DoD) Directive 4715.11 *Environmental and Explosives Safety Management on Operational Ranges within the United States* and DoD Instruction 4715.14 *Operational Range Assessments*, which serves the following purposes:

- Determining whether there has been a release or substantial threat of a release of munitions constituents of potential concern from an operational range to an off-range area.
- Determining whether the release or substantial threat of a release of munitions constituents of potential concern from an operational range to an off-range area poses an unacceptable risk to human health or the environment.
- Enhancing the Navy's ability to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern from operational ranges or range complexes to off-range areas that could pose unacceptable risks to human health or the environment.
- Using data quality objectives and conceptual site models to develop sampling strategies, where necessary to fill data gaps and provide necessary information to confirm whether source-receptor interactions exist and whether or not unacceptable risks to human health or the environment exist.

Requirements, procedures, and protective measures necessary for implementing range assessments under RSEPA are provided in the Navy's RSEPA policy implementation manual (U.S. Department of the Navy 2006a). The process includes:

- **Range Condition Assessments** – The goal of the Range Condition Assessment (RCA) is to determine if further steps are necessary to maintain compliance and whether further analysis is required to assess risks of off-range releases of munitions constituents of potential concern beyond the range boundary. Range Condition Assessments are required every 5 years at each range regardless of whether a Comprehensive Range Evaluation (CRE) is conducted. A RCA re-evaluation also is required whenever significant changes (e.g., changes in range operations, site conditions, applicable statutes, regulations, DoD issuances, or other policies) occur that affect determinations made during the previous assessment.
- **Comprehensive Range Evaluations** – The purpose of a CRE is to collect and analyze additional data to assess the potential for the off-range release of munitions constituents of potential concern, as necessary based on findings of the RCA. The CRE includes two phases and two decision points. Protective measures may be implemented during either phase, if appropriate. If a CRE is performed, sampling and testing of appropriate environmental media will be conducted.
- **Sustainable Range Oversight** – The purpose of the Sustainable Range Oversight is to ensure range sustainability while addressing off-range releases of munitions constituents of potential concern through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. A Sustainable Range Oversight includes implementation of the CERCLA

process to address confirmed off-range releases while implementing on-range protective measures to address munitions constituent migration.

3.1.1.2.4 Operational Range Clearance

Chief of Naval Operations Instruction 3571.4 *Operational Range Clearance Policy for Navy Ranges* establishes the policy and requirements for performing operational range clearance on Navy ranges in accordance with DoD Directive 4715.11. The purpose of the Operational Range Clearance Plan is to ensure the safety of aircrews, range operations, and maintenance personnel, range clearance personnel, and the public. The most recent update to the *NWSTF Boardman Operational Range Clearance Plan* was completed in January 2014 (U.S. Department of the Navy 2014). The plan is updated every 5 years or sooner if training operations, operational tempo, or range characteristics change significantly. Clearance activities are accomplished to meet range-specific needs based on the following range clearance categories specified in Chief of Naval Operations Instruction 3571.4:

- **Laser Training Events** – All reflective surfaces (specular hazards) that are not specifically approved for use in the exercise, such as mirrors, bottles, windows, shiny metal, or other surfaces that have a high coefficient of specular reflection or the potential to adversely affect training, must be removed from laser ranges/targets to an appropriate distance at an appropriate frequency to ensure laser training events are not adversely affected.
- **Target Fidelity** – To ensure all targets resemble the objective of the mission and are distinguishable from their surroundings, all material potentially presenting an explosive hazard located on the surface and partially buried that are greater than 4 inches (in.) (10.2 centimeters [cm]) in any dimension, must be removed to an appropriate distance from the target and at an appropriate frequency. In addition, any significant unevenness of the ground surface (e.g., craters, holes, ruts, etc.) around each target must be removed.
- **Maintenance Personnel Safety** – To ensure the safety of maintenance personnel, operational range clearance requirements must address ingress/egress routes, run-in lines, maintenance roads, and sufficient area around each target to afford safe movement and operation of personnel and equipment. From these areas, all material potentially presenting an explosive hazard located on the surface or partially buried that is greater than 4 in. (10.2 cm) in any dimension must be removed to an appropriate distance at appropriate frequencies. Target areas affected by intrusive activity may be cleared to 1 foot (ft.) (0.3 meter [m]) below the anticipated intrusive depth.
- **Long-Term Range Sustainment** – Effective, efficient, and environmentally compliant management of ranges are key to ensuring range capabilities are available to meet current and future requirements. As such, operational range clearance requirements must address areas that may not be routinely accessed. Areas that support various range management activities as well as areas that pose a potential concern to human health or the environment shall undergo clearance activities. For these areas, all material potentially presenting an explosive hazard greater than 4 in. (10.2 cm) in any dimension located on the surface or partially buried must be removed at appropriate frequencies. Prescribed areas should be cleared until a density of less than or equal to five intact items per acre is encountered.

3.1.1.3 Determination of Significance

The impact analysis for soils considered possible changes in the physical and chemical characteristics of soils that could result from the Proposed Action. Such changes could arise from ground disturbing activities (e.g., construction and equipment use), incidental spills, or use of military munitions. Specific impacts might include soil erosion from wind or water, soil compaction, and soil contamination. Factors used in the determining whether impacts to soils would be significant relate to the extent to which their physical or chemical characteristics are changed, other than in localized areas, such that (1) soils could no longer support important ecological functions (e.g., supporting native plant communities, providing burrowing habitat for wildlife, etc.), or (2) soils were contaminated to the extent that they would be considered a source of contamination that represents a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment.

3.1.2 AFFECTED ENVIRONMENT

3.1.2.1 Geology and Topography

The landform of NWSTF Boardman has been directly shaped by the Bretz floods of 12,000 years ago, plus the consequential development of a series of prehistoric lakes collectively called Lake Condon. The northern two-thirds of the facility gently rises in broad, flat alluvial terraces from approximately 400 ft. (122 m) at the northern boundary to about 700 ft. (213 m) (Figure 3.1-1). It largely represents an area scoured by the last Bretz floods, which deposited sandy and gravelly alluvium in their wakes. Most of the soil in this area is dominated by glaciofluvial sands deposited by the Bretz floods. In places, the sand forms extensive dune systems (U.S. Department of the Navy 2012).

The southern one-third of the facility is much hillier and ranges in elevation from 700 to 950 ft. (213 to 290 m); this is a buildup of lacustrine silt deposits from the old Lake Condon. The 150 ft. (46 m) deep Juniper Canyon is a prominent feature here, with slopes to 20 percent, although the upper reaches of Well Springs and Sixmile canyons also provide distinct topographical relief (U.S. Department of the Navy 2012).

The entire facility is underlain by Columbia River basalt deposited during the Miocene epoch to maximum depths of 4,000 ft. (1,219 m). These deposits are overlain by lacustrine silts deposited to depths of 1,000 ft. (305 m) during the Bretz floods and Lake Condon formation. Lacustrine deposits nearest the Columbia River were eventually washed away during sporadic flood events leaving behind sandy alluvium. This sandy material was eventually reworked by prevailing winds and redeposited over some of the lacustrine deposits farther south of the Columbia River, including the northern half of the facility. The southern half of the facility is also covered with loess re-deposits, mostly silty loams. Consequently, all surface soils on the facility are wind deposits with very high wind erosion potential (U.S. Department of the Navy 2012).

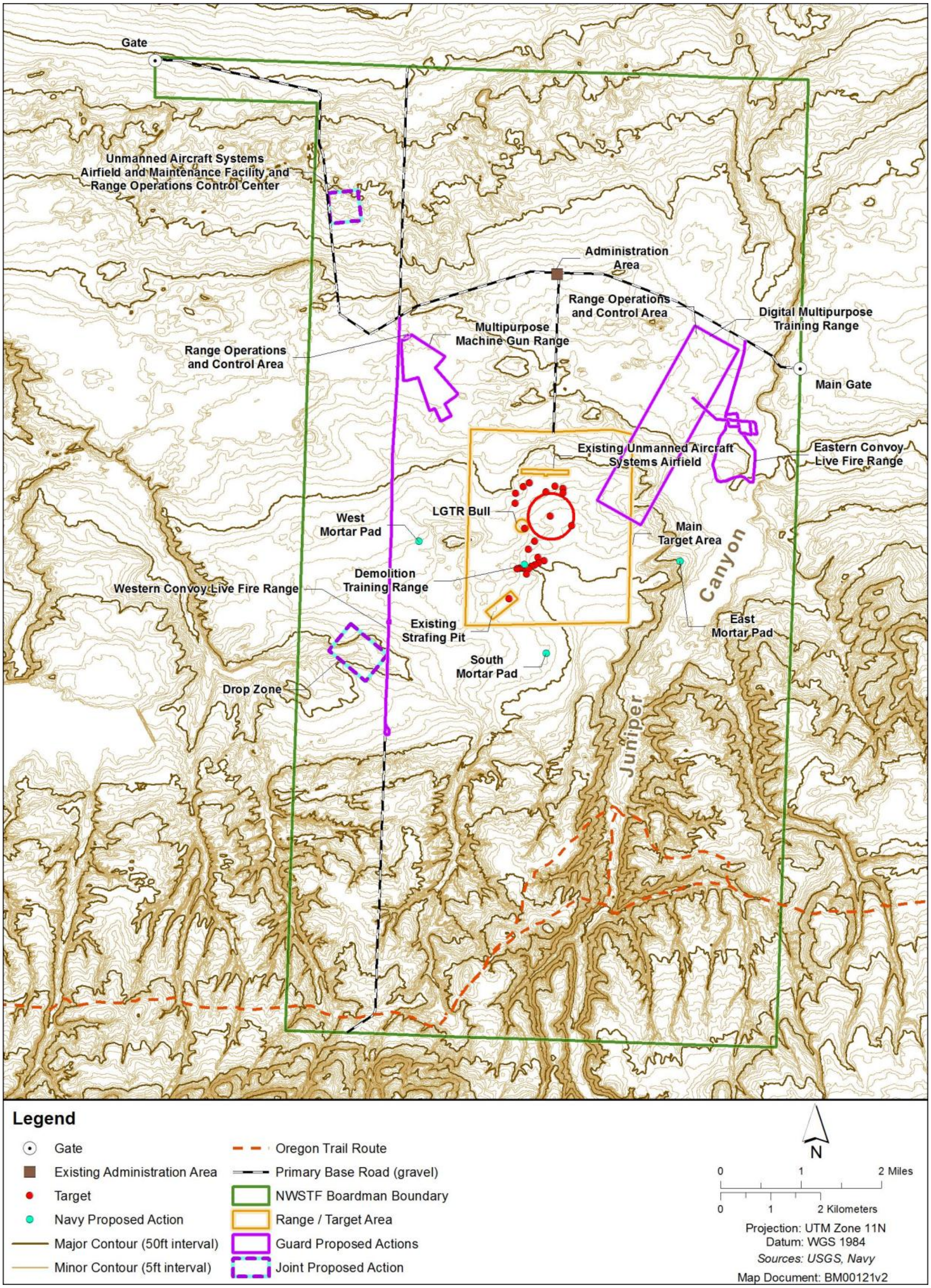


Figure 3.1-1: Topography at NWSTF Boardman

3.1.2.2 Soils

3.1.2.2.1 Soil Descriptions

Three major soil associations occur on the facility as shown in Figure 3.1-2: Quincy-Koehler, Sagehill-Taunton, and Warden (U.S. Department of Agriculture 1983). These major associations are represented by 34 soil mapping units, some of which are classified as prime farmland or farmland of statewide importance based on data from the Natural Resources Conservation Service (Table 3.1-1 and Figure 3.1-3). The Quincy-Koehler association consists of soils on alluvial sand over alluvial gravel deposits on gently sloping terraces. On NWSTF Boardman, the association includes about 55 percent Quincy soil, 35 percent Koehler, and a combined 10 percent for Burbank, Hezel, Quinton, and Royal. These deep, loamy fine sand soils dominate the northern half of the facility.

Moving southward on the facility, the Quincy-Koehler association is replaced by the more sandy loam Sagehill-Taunton association. Soils in this association were formed on loess over lacustrine or a hardpan, and dominate the terrace front of the facility south end. Major soils include Sagehill (65 percent), Royal (20 percent), Taunton (10 percent), and Ellum (5 percent). These soils are very deep with a sandy loam or fine sandy loam surface.

The southern one-quarter of the facility is almost entirely Warden soils (90 percent). This is a very deep, well-drained soil with a silty loam surface. Warden soils developed in loess over lacustrine silt and form the terrace tops above Juniper Canyon and other canyons of the south end. Lesser (less than 10 percent) represented soils include Lickskillet and Xeric Torriorthents. Lickskillet soils are shallow stony soils composed of loess and basalt residuals. These soils are found on west and south-facing slopes of Juniper Canyon, and are punctuated with rock outcroppings. Xeric soils are deep wind and water lain accumulations in dry canyon bottoms. Because of high summer temperatures and excessive draining, these soils are unusually dry.

In some locations, wind and water processes have dramatically altered the surface layers of native soils presenting a much different appearance. These include areas where wind-borne sand has accumulated into dunes devoid of vegetation. Dunes are largely found on the north end of NWSTF Boardman and in the middle of Juniper Canyon. “Alkaline” soils, also bare of vegetation, can be found on the south end of NWSTF Boardman. These include areas near Tub Spring where the surface soil has eroded away revealing calcareous lacustrine silt under layers high in sodium and calcium. More classic alkaline soil is found at Well Springs where excessive evaporating of rain and spring water has allowed the accumulation of salts, especially sodium, on the surface horizon.

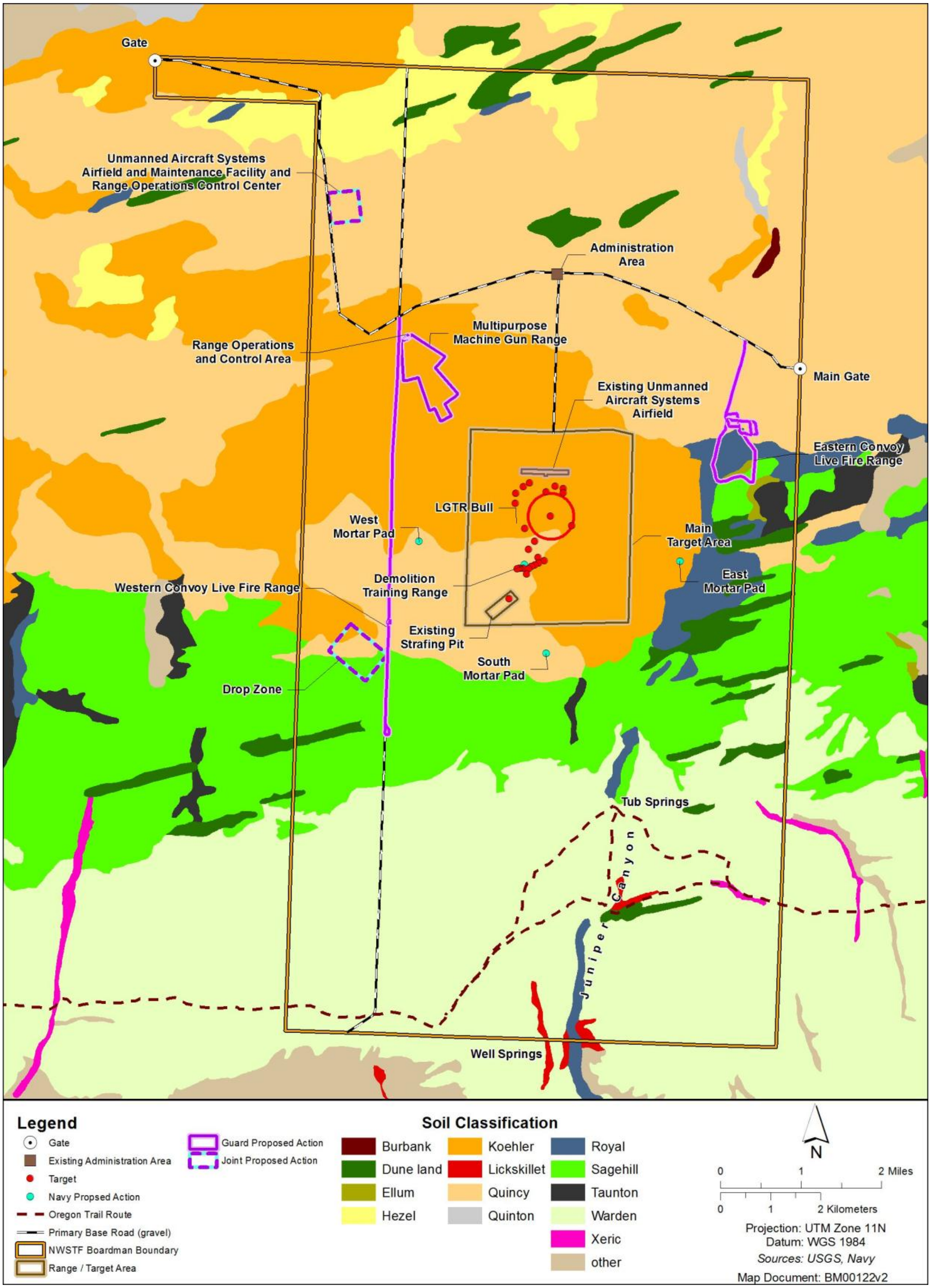


Figure 3.1-2: Soils at NWSTF Boardman

Table 3.1-1: Soil Map Units, Soil pH, and Farmland Classification of Soils at NWSTF Boardman

Soil Mapping Unit	pH	Farmland Classification
Burbank loamy fine sand, 2 to 5 percent slopes	7.2	Not prime farmland
Dune land	–	Not prime farmland
Ellum fine sandy loam, 5 to 12 percent slopes	7.6	Farmland of statewide importance
Hezel loamy fine sand, 2 to 5 percent slopes	8.4	Farmland of statewide importance
Hezel loamy fine sand, 5 to 12 percent slopes	8.4	Farmland of statewide importance
Koehler loamy fine sand, 2 to 5 percent slopes	7.9	Not prime farmland
Koehler loamy fine sand, 5 to 12 percent slopes	7.9	Not prime farmland
Lickskillet very stony loam, 7 to 40 percent slopes	6.7	Not prime farmland
Quincy loamy fine sand, 2 to 12 percent slopes	7.3	Not prime farmland
Quinton loamy fine sand, 2 to 5 percent slopes	7.8	Not prime farmland
Royal fine sandy loam, 2 to 5 percent slopes	7.2	Prime farmland if irrigated
Royal fine sandy loam, 5 to 12 percent slopes	7.2	Farmland of statewide importance
Royal loamy fine sand, 2 to 5 percent slopes	7.2	Not prime farmland
Royal silt loam, 0 to 3 percent slopes	7.2	Prime farmland if irrigated
Sagehill fine sandy loam, 2 to 5 percent slopes	7.5	Prime farmland if irrigated
Sagehill fine sandy loam, 5 to 12 percent slopes	7.5	Farmland of statewide importance
Sagehill fine sandy loam, 12 to 20 percent slopes	7.5	Farmland of statewide importance
Sagehill fine sandy loam, hummocky, 2 to 5 percent slopes	7.5	Farmland of statewide importance
Sagehill fine sandy loam, hummocky, 5 to 12 percent slopes	7.5	Farmland of statewide importance
Sagehill fine sandy loam, hummocky, 2 to 5 percent slopes	7.5	Farmland of statewide importance
Taunton fine sandy loam, 2 to 5 percent slopes	6.9	Prime farmland if irrigated
Taunton fine sandy loam, 5 to 12 percent slopes	6.9	Farmland of statewide importance
Warden very fine sandy loam, 2 to 5 percent slopes	7.2	Prime farmland if irrigated
Warden very fine sandy loam, 5 to 12 percent slopes	7.2	Farmland of statewide importance
Warden very fine sandy loam, 12 to 20 percent slopes	7.2	Farmland of statewide importance
Warden silt loam, 0 to 2 percent slopes	7.2	Prime farmland if irrigated
Warden silt loam, 2 to 5 percent slopes	7.2	Prime farmland if irrigated
Warden silt loam, 5 to 12 percent slopes	7.2	Farmland of statewide importance
Warden silt loam, 12 to 20 percent slopes	7.2	Farmland of statewide importance
Warden silt loam, 20 to 40 percent slopes	7.2	Farmland of statewide importance
Warden silt loam, 3 to 12 percent slopes, eroded	7.2	Farmland of statewide importance
Warden silt loam, 12 to 20 percent slopes, eroded	7.2	Farmland of statewide importance
Xeric Torriorthents, nearly level	7.0	Farmland of statewide importance

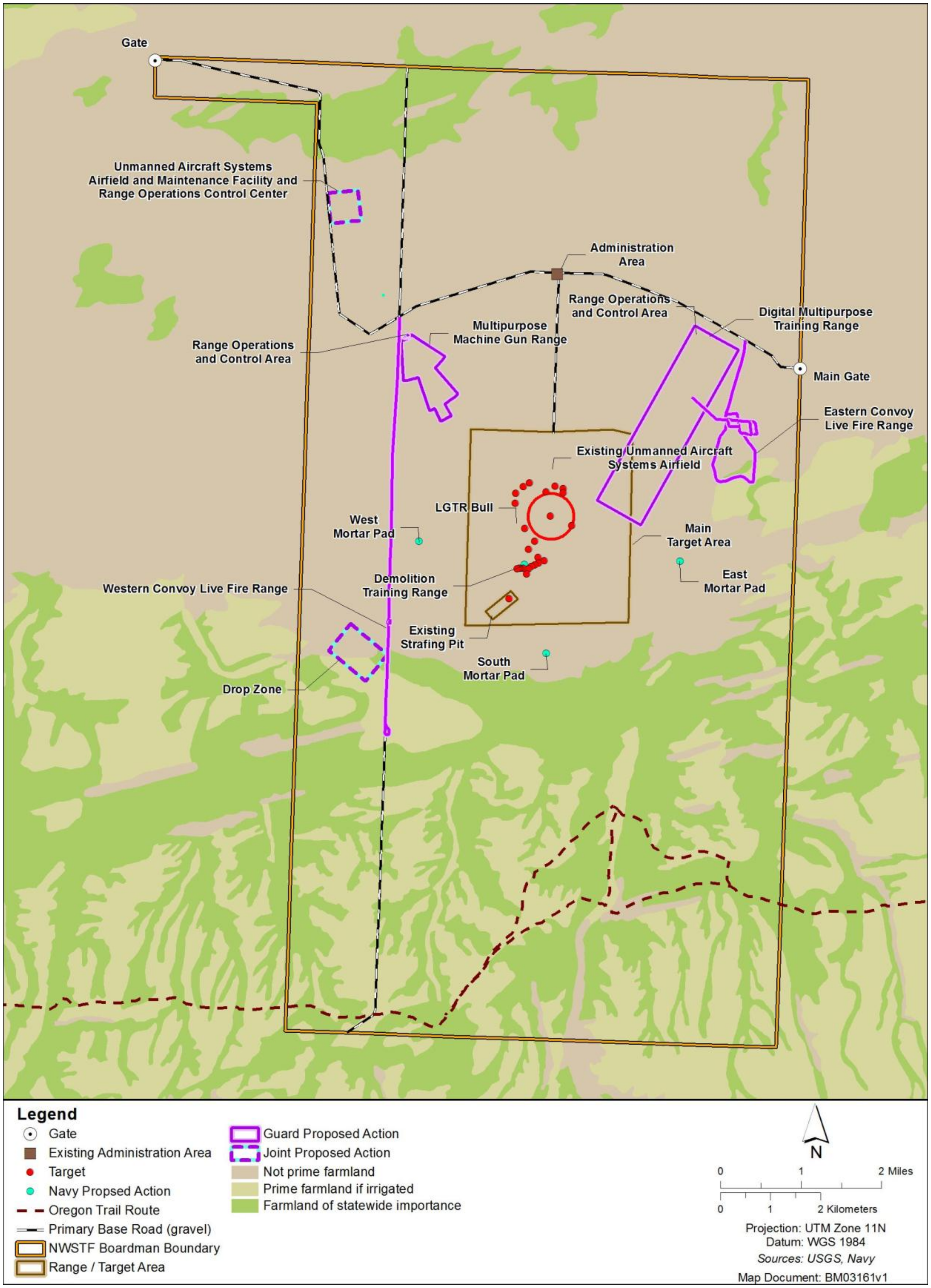


Figure 3.1-3: Prime Farmland Designations at NWSTF Boardman

3.1.2.2.2 Existing Soil Contamination

The potential for contamination of soils exists from historic use of NWSTF Boardman for military training and facility maintenance and support activities. Range Sustainability Environmental Program Assessment projects conducted at NWSTF Boardman identified areas where soil contamination might exist (Figure 3.1-4) (U.S. Department of the Navy 2004, 2006b, 2011a, 2011b).

During the 2005 Comprehensive Range Evaluation Phase I Field Investigation (U.S. Department of the Navy 2006b), a total of 15 soil samples were collected from three areas (Army Open Burn/Open Detonation Area, Demolition Crater Area, and West Bomb Crater Field) and analyzed for perchlorate, explosives, and nitrate-nitrite. Soil sampling results were compared to RSEPA target analyte screening values for residential and industrial use areas, which were based on U.S. EPA Region 9 preliminary remediation goal tables, in accordance with RSEPA policy (U.S. Department of the Navy 2006a,b). Four surface soil samples from a single area, the Army Open Burn/Open Detonation Area, yielded detections of target compounds. The detections included octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) in four samples ranging from 0.068 to 1.40 milligrams per kilogram (mg/kg). The residential soil screening value for HMX is 3,100 mg/kg and the industrial soil screening value is 31,000 mg/kg. All HMX detections were well below RSEPA residential soil screening values. The compound 2,4,6-trinitrotoluene (TNT) was detected in two samples at 0.11 and 0.35 mg/kg, both below the RSEPA residential soil screening value of 16 mg/kg. Only Research Department Explosive (RDX) was detected at levels above the RSEPA screening values, at 6 mg/kg in one sample and 18 mg/kg in another sample. The RDX screening values for residential and industrial soil are 4 and 16 mg/kg, respectively. The detections that exceed the screening values are from the Army Open Burn/Open Detonation Area. This area is located in the interior of NWSTF Boardman and does not have a direct soil transport pathway off-range (U.S. Department of the Navy 2006b).

In 2010, additional surface soil samples collected from the following locations were evaluated for perchlorate, explosives, and nitrate-nitrite (Figure 3.1-4) (U.S. Department of the Navy 2011b):

- a former range munitions and scrap consolidation area;
- a potential fuze demolition area, where visual evidence suggested past use of this area for open detonation of munitions, including fuze components;
- an area west of the current administrative compound that exhibited visual evidence consistent with past undocumented use of this area for open detonation of munitions (i.e., detonation craters and fragments of munitions items); and
- the former North Target Area.

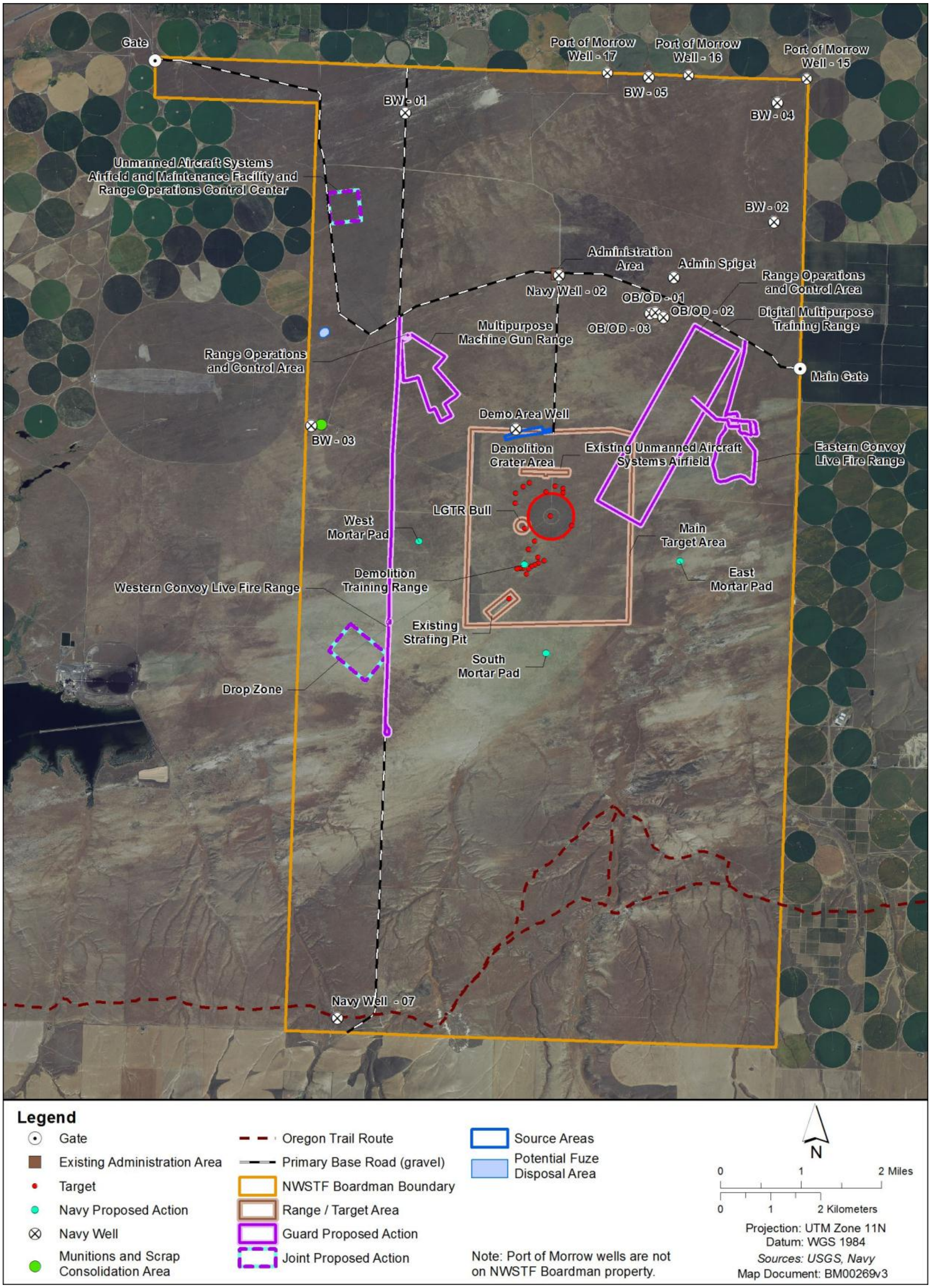


Figure 3.1-4: Range Condition Assessment Study Areas at NWSTF Boardman

The analytical results are summarized in the following bullets (U.S. Department of the Navy 2011b):

- Perchlorate was not detected in surface soil at any of the locations.
- The RDX compounds hexahydro-1,3,5-trinitro-1,3,5-triazine and/or tetryl were detected in two soil samples. RDX was detected at a concentration of 0.041 mg/kg, which is well below the residential screening value of 5.5 mg/kg and the industrial screening value of 24 mg/kg. Tetryl was detected at concentrations of 1.40 mg/kg and 0.41 mg/kg, which are well below the residential screening value of 240 mg/kg and the industrial screening value of 2,500 mg/kg. The screening values used in the 2010 evaluation were updated based on the May 2010 U.S. EPA regional screening value table (U.S. Department of the Navy 2011b).
- Nitrate-nitrite was detected at all four locations. Concentrations ranged from 2.8 mg/kg to 10.7 mg/kg, which are well below the screening values for nitrate (130,000 mg/kg) and nitrite (7,800 mg/kg).

The Range Condition Assessments and Comprehensive Range Evaluations concluded that there is no potential for off-range releases at NWSTF Boardman at concentrations which exceed the RSEPA screening values and that no additional soil sampling is necessary (U.S. Department of the Navy 2011a, 2011b). A 5-year review of the Range Condition Assessment for NWSTF Boardman is scheduled in 2015–2016.

Metals, including lead, have not been identified as munitions constituents of concern at NWSTF Boardman during the RSEPA process. Therefore, metal concentrations were not measured in soil samples during RSEPA analyses conducted at NWSTF Boardman. However, metals (target analyte list metals, which include copper, lead, and 21 other metals) were analyzed in soils collected in 2007 during a site inspection completed by the U.S. Army Corps of Engineers at the Boardman Air Force Range Formerly Used Defense Site (59,000 acres [ac.] [23,877 hectares {ha}]) bordering NWSTF Boardman to the west). Analytical results indicate that all soil metals were below background values for the Air Force Range Formerly Used Defense Site (U.S. Army Corps of Engineers 2007).

In 2011, the U.S. Army Institute of Public Health conducted a Preconstruction Assessment for proposed locations of new ranges at NWSTF Boardman on behalf of the Oregon National Guard (ORNG) (U.S. Army Public Health Command 2011). This assessment was performed to collect information regarding the history and environmental condition of the proposed range locations and to develop an understanding of past site activities and disposal practices that might have resulted in contamination. The Preconstruction Assessment did not identify soil-related constraints associated with past site activities and disposal practices, with the exception of previously identified concerns associated with possible unexploded ordnance, which will be addressed during range design and construction.

3.1.2.3 Current Requirements and Management Practices

Following is a summary of current requirements and practices applicable to soils at NWSTF Boardman.

- Soils are managed from a natural resources perspective under the *Naval Weapons Systems Training Facility Boardman Integrated Natural Resources Management Plan* (U.S. Department of the Navy 2012). Actions focus on minimizing mechanical disturbance, restoration of native habitats to minimize soil erosion, and stabilizing soils following a wildfire to the extent practicable.
- Incidental spills that could contaminate soils are avoided and minimized through the *Hazardous Waste Management Plan* (U.S. Department of the Navy 2009). Navy personnel at NWSTF

Boardman receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials.

- Incidental spills from ORNG activities are addressed in Oregon Army National Guard Regulation 420-47, *Hazardous Material, Waste, and Spill Management Plan*.
- Potential soil contamination is addressed in the Range Condition Assessment and subsequent 5-year reviews, in accordance with the *Range Sustainability Environmental Program Assessment Policy Implementation Manual* (U.S. Department of the Navy 2006a).

3.1.3 Environmental Consequences

3.1.3.1 No Action Alternative

3.1.3.1.1 Ground Disturbing Activities

No construction would take place under the No Action Alternative. Ground disturbing activities would continue to include vehicle and equipment operation, non-explosive practice munitions impacts, target maintenance, and fire break maintenance.

Limited ground-based training would continue to take place at NWSTF Boardman under the No Action Alternative. None of this training involves large numbers of vehicles and vehicle use takes place on the road network, which primarily consists of primitive dirt roads. A few gravel roads are periodically maintained. Continued vehicle use on dirt roads would result in soil disturbance and compaction in previously disturbed areas.

The Main Target Area includes the main bull's eye, the strafe pit, the laser-guided training range bull's eye, and several single targets or grouped target sets (e.g., old vehicles, tanks, etc.). The vegetation in and around each of these targets must be maintained or removed for fire safety and to provide a viable visual cue to pilots. This is accomplished by mechanical disturbance (e.g., plowing or disking) with a tractor on an as-needed basis, typically one time per year. Approximately 23 ac. (9.3 ha) in the Main Target Area would be subjected to this maintenance under the No Action Alternative. Fire breaks throughout NWSTF Boardman are also maintained annually by mechanical disturbance (e.g., plowing or disking) with a tractor. Approximately 462 ac. (187 ha) of fire breaks are maintained. A total area of approximately 485 ac. (196 ha) would continue to be maintained by mechanical disturbance under the No Action Alternative. In addition, the existing unmanned aircraft system runway is maintained as necessary by grading and compacting the dirt surface. Disturbed soils at NWSTF Boardman are susceptible to wind erosion based on their texture and because winds in excess of 25 miles per hour (mph) (40 kilometers per hour [kph]) are common from March to July. Water erosion is less of a concern because of the flat terrain and precipitation is only about 9 to 11 in. per year (23 to 28 cm). Disking and compaction of soils also alters the natural soil profile and structure, and makes them less suitable as burrowing habitat for wildlife such as the Washington ground squirrel, badger, and western burrowing owl.

Most non-explosive practice munitions would strike the ground in maintained areas where surface soils have been previously disturbed. Additional soil disturbance would be minimal. The Main Target Area and fire breaks have been subjected to similar maintenance and disturbance regimes for years. Therefore, ground disturbing activities under the No Action Alternative would not result in additional impacts on soils. The effects of ground disturbing activities on soils under the No Action Alternative would be long-term and minor in the form of increased potential for soil erosion, compaction, and alteration of natural soil profiles and structure. The direct effects would occur in previously disturbed areas along dirt roads, along fire breaks, and within the Main Target Area. Ground disturbing activities would not result in significant impacts on soils under the No Action Alternative.

3.1.3.1.2 Potential Soil Contamination

Potential sources of soil contamination would not change under the No Action Alternative and include incidental spills of fuel during equipment fueling and non-explosive practice munitions. The potential for incidental spills that could contaminate soils is low based on the small quality of petroleum, oil, and lubricants used in the administrative area. A 1,000-gallon (3,785-liter) aboveground storage tank with built-in secondary containment is located in the administrative area. It contains diesel for fueling vehicles. Any spill would be contained and responded to immediately. Based on the limited volume of material currently stored at NWSTF Boardman, a spill prevention, control, and countermeasures plan is not required. However, Navy personnel at NWSTF Boardman receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials. The limited amounts of hazardous waste generated at NWSTF Boardman are managed in accordance with the *Hazardous Waste Management Plan* (U.S. Department of the Navy 2009).

Non-explosive practice munitions would continue to accumulate in soils within the Main Target Area. Non-explosive practice bombs and range scrap would be removed at regular intervals based on the *Operational Range Clearance Plan* (U.S. Department of the Navy 2014), which is updated on a regular basis. Spent small- and medium-caliber rounds would not be removed at regular intervals, would accumulate in soils over time, and would alter soil composition through the presences of solid particles. Small- and medium-caliber rounds primarily consist of steel or a lead core with a copper jacket. A potential concern is the fate and transport of metals from bullets and bullet fragments accumulating in soil, with lead being the primary constituent of concern because of its toxicity and its ability to persist in the environment (U.S. Army Environmental Center 1998).

Several factors influence the fate and transport of lead on a training range, including soil type, soil pH, annual precipitation rate, and topographic slope (U.S. Environmental Protection Agency 2005). Lead oxidizes when exposed to air and dissolves when exposed to acidic water or soil, but is generally insoluble and immobile under neutral or basic pH conditions (U.S. Environmental Protection Agency 2005). The corrosion products of lead bullets in soil environments consist primarily of hydrocerussite, which is relatively insoluble (Chen and Daroub 2002). However, Dermatas et al. (2004) demonstrated that, in the case of a lead bullet with a copper jacket, the presence of copper increased the solubility of lead significantly, due to a galvanic corrosion reaction. Lead and copper concentrations were highly elevated in surface soils at two small arms ranges on Fort Irwin, California, but quickly decreased as a function of increasing depth from the ground surface. Despite the galvanic corrosion reaction, the mobility of both metals was significantly reduced within the first 10 to 20 in. (25.4 to 50.8 cm) below the surface. The limited mobility was attributed to the alkaline characteristics of the soils (pH 7.48 to 7.65 on one range and 8.03 to 8.30 on the other) and the formation of secondary minerals such as hydrocerussite (Dermatas et al. 2004).

Ideal soil pH for firing ranges is 6.5 to 8.5 because the lead precipitates out of solution and binds to the soil within this pH range (U.S. Environmental Protection Agency 2005). This binding effect prevents the lead from migrating to the subsurface and groundwater. As shown in Figure 3.1-2, Koehler and Quincy soils are found within and around the Main Target Area. Lead would be expected to have limited mobility in these neutral to slightly alkaline soils (pH 7.3 to 7.9, Table 3.1-1).

Lead mobility would also be limited by the low annual precipitation rate at NWSTF Boardman (9–11 in. per year [23–28 cm]). Lead would weather slowly under these arid conditions because it would have limited contact with water. Low precipitation and lack of permanent surface water coupled with the flat terrain in and around the Main Target Area also makes it unlikely that lead would be transported outside the immediate target area by stormwater runoff (U.S. Environmental Protection Agency 2005). In addition, previous surface water and soil loss modeling conducted for other munitions constituents indicate that off-range release via stormwater runoff is unlikely (U.S. Department of the Navy 2004).

Lead-contaminated soils can also be transported by wind erosion. Soils at NWSTF Boardman are susceptible to wind erosion based on their texture and because winds in excess of 25 mph (40 kph) are common from March to July. Soils are more susceptible to erosion following wildfires, which have occurred frequently at NWSTF Boardman in recent years. Therefore, surface soils containing lead are likely transported on the range to some degree. However, an off-range release of lead by wind that poses unacceptable risk to human health or the environment is unlikely because concentrated sources, such as a small arms range berms, are not present. In addition, the potential for off-range release is minimized by the distance of the Main Target Area to the range boundary (approximately 2–5 mi. [3.2–8.0 km]). Lead has not been identified as a munitions constituent of concern at NWSTF Boardman during the RSEPA process.

Lead would be expected to be relatively immobile in soils at NWSTF Boardman based on soil pH, limited annual precipitation, and the flat terrain. Elevated concentrations would likely be limited to surface soils in the immediate area of projectile impact. Effects of contaminants on soils under the No Action Alternative would be long-term, but the effects would be localized. Elevated concentrations of lead in soils would not represent a substantial threat of a release to an off-range area via groundwater, surface water, or wind that poses unacceptable risk to human health or the environment. There would be no significant impacts on soils from possible contamination under the No Action Alternative.

3.1.3.2 Alternative 1

3.1.3.2.1 Ground Disturbing Activities

Construction Activities

Site excavation, grading, and equipment operations during construction of the proposed range enhancements for Alternative 1 would result in temporary disturbances to the ground surface. The area of disturbance for individual construction projects would range from 1 to 40 ac. (0.4 to 16 ha). The total area of disturbance would be about 92 ac. (37.2 ha), 13 ac. (5.3 ha) of which have been previously disturbed (Table 2-5). Koehler and Quincy soils would be the primary soil types affected (Figure 3.1-2). Approximately 79 ac. (32.01 ha) of previously undisturbed soils would be affected, about 49 ac. (20.2 ha) would be permanently converted to development, and about 30 ac. (11.7 ha) would be temporarily disturbed and revegetated. Soils in areas converted to development would permanently lose their ability to support native vegetation. However, the area affected is small relative to the total land area at NWSTF Boardman (about 0.1 percent). Temporarily disturbed areas would be restored in accordance with the proposed *Post-construction Habitat Restoration Plan* (Appendix F, Additional Biological Information). The range enhancements would not be implemented simultaneously. Construction activities for the range enhancements would be spaced over a period of several years as funding becomes available (Table 2-6). Therefore, the area of disturbance at any given time during construction would be much less than the total 92 ac. (37.2 ha).

Portions of the drop zone and eastern Convoy Live Fire Range (CLFR) are the only Alternative 1 proposed range enhancements that would be sited on soils classified as prime farmland or farmland of statewide importance (Figure 3.1-3, Table 3.1-1). No construction or development would be required for the drop zone. Establishing the eastern CLFR would involve placement of gravel on existing dirt roads and establishment of temporary target emplacements. These activities would not irreversibly convert soils that are classified as prime farmland or farmland of statewide importance.

Disturbed soils would be susceptible to erosion. As discussed for the No Action Alternative, wind erosion is more of a concern than water erosion. Management practices (MPs) would be implemented during construction to avoid and minimize the potential for wind and water erosion in accordance with the Oregon Department of Environmental Quality *Erosion and Sediment Control Manual* (Oregon Department of Environmental Quality 2005). Implementation of MPs and the proposed *Post-construction Habitat Restoration Plan* (Appendix F, Additional Biological Information) would effectively minimize erosion over the long term.

Soils in the area of disturbance could also become compacted, which could limit their ability to support plant growth or burrowing habitat for species such as the Washington ground squirrel, badger, and western burrowing owl. Areas temporarily disturbed and restored are also likely to become less suitable burrowing habitat for at least several years following restoration. Measures to avoid, minimize, and mitigate impacts on wildlife habitat are discussed in Section 3.6 (Wildlife) and Chapter 5 (Management Practices, Monitoring, and Mitigation Measures).

Construction activities under Alternative 1 would result in long-term minor effects to soils in the form of conversion to development, erosion, compaction, and alteration of natural soil profiles and structure. The effects would be localized and the area permanently converted to development would be small relative to the total land area at NWSTF Boardman (about 0.1 percent). There would be no significant impacts on soils from construction activities under Alternative 1.

Training Activities

Training activities on the new ranges under Alternative 1 would result in additional ground disturbance compared to the No Action Alternative. Soils around targets on the new ranges would be disturbed by non-explosive practice munitions striking the ground and during placement or relocation of targets along the eastern CLFR. Some of the areas affected would coincide with areas temporarily disturbed during construction. Vehicle and equipment use would increase substantially under Alternative 1 during ground-based training events. However, vehicles, including tracked vehicles, would continue to use existing roads or new gravel roads constructed under Alternative 1. No maneuver training off of these roads is proposed. Disturbed areas would be susceptible to erosion. Ground disturbance from training activities under Alternative 1 would result in long-term minor effects to soils in the form of increased potential for erosion, compaction, and alteration of natural soil profiles and structure. The effects would be localized, but more widespread than the No Action Alternative. There would be no significant impacts on soils from training activities under Alternative 1.

Maintenance Activities

Maintenance activities around targets in the Main Target Area under Alternative 1 would be the same as those described for the No Action Alternative. Approximately 23 ac. (9.3 ha) would continue to be maintained by mechanical disturbance. However, as discussed in Section 3.13 (Wildfire), the *Draft Integrated Wildland Fire Management Plan* (Appendix H) includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created (Figure 3.13-3). The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Areas removed from mechanical maintenance would be planted with native bunchgrasses to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible. The proposed modifications to the fire break system could result in long-term benefits to soils at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would reduce the potential for soil erosion.

Indirect Effects of Increased Wildfire Risk

As discussed in Section 3.13 (Wildfire), the proposed increases in training at NWSTF Boardman could increase the risk of wildfire. To address this issue, the Navy and ORNG prepared a *Draft Integrated Wildland Fire Management Plan*, which contains a Fire Danger Rating and Wildland Fire Risk Management Matrix. Specifics regarding implementation of the Plan are provided in Section 3.13 (Wildfire) and Appendix H (Draft Integrated Wildfire Management Plan). Soil erosion could occur indirectly from fire-caused decreases in vegetation cover and biological soil crust. However, the additional fire protection measures and resources that would be put in place under Alternative 1 would mitigate the increased fire risk (see Section 3.13, Wildfire) and avoid or minimize potential indirect effects to soils.

3.1.3.2.2 Potential Soil Contamination

The potential for incidental spills that could contaminate soils would increase under Alternative 1 because additional refueling would be necessary for some of the ORNG ground-vehicles. While ORNG wheeled vehicles would not be refueled at NWSTF Boardman, Abrams tanks and Bradley fighting vehicles would be refueled in the field using Heavy Expanded Mobility Tactical Trucks (i.e., HEMTT or tanker trucks) and portable secondary containment devices. Risk of a spill contaminating soils is considered negligible based on existing standard operating procedures, periodic spill response training, and use of secondary containment during refueling.

Non-explosive practice munitions would continue to accumulate in soils within the Main Target Area, as well as on the new ranges. Non-explosive practice bombs and range scrap would be removed at regular intervals based on the *Operational Range Clearance Plan* (U.S. Department of the Navy 2014), which is updated on a regular basis. Spent small- and medium-caliber rounds would not be removed at regular intervals, would accumulate in soils over time, and would alter soil composition through the presences of solid particles. The fate and transport of lead on firing ranges is a potential concern. However, as discussed for the No Action Alternative, lead would be expected to have limited mobility based on neutral to alkaline soil pH, limited precipitation, and flat terrain at NWSTF Boardman. As shown in Figure 3.1-2, the proposed Multipurpose Machine Gun Range (MPMGR) and Digital Multipurpose Training Range (DMPTR) would be constructed on Koehler and Quincy soils, with pH values in the range of 7.3 to 7.9 (Table 3.1-1). The eastern CLFR would be sited on Koehler, Quincy, Royal, Ellum, and Sagehill soils, with pH values in the range of 7.2 to 7.9. Lead precipitates out of solution and binds to the soil within these pH ranges, preventing or limiting migration to the subsurface (Dermatas et al. 2004, U.S. Environmental Protection Agency 2005). The flat terrain on the proposed ranges coupled with low precipitation also makes it unlikely that lead would be transported outside the immediate target area by stormwater runoff. As discussed for the No Action Alternative, surface soils containing lead would likely be transported by wind on the range to some degree under Alternative 1. However, an off-range release of lead by wind that poses unacceptable risk to human health or the environment is unlikely because concentrated sources, such as a small arms range berms, would not present on the new ranges. The potential for off-range release would be minimized by the distance of the new ranges to the NWSTF Boardman boundary (approximately 0.5–1.0 mi. [0.8–1.6 km]). In addition, MPs would be implemented to minimize lead migration.

Once the MPMGR, DMPTR, and eastern CLFR are operational, ORNG would conduct assessments in accordance with the Army's Operational Range Assessment Program to fulfill requirements identified in DoD Directive 4715.11 *Environmental and Explosives Safety Management on Operational Ranges Within the United States* and DoD Instruction 4715.14 *Operational Range Assessments*. These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual* (U.S. Army Environmental Center 2005).

In summary, lead would be expected to be relatively immobile in soils at NWSTF Boardman based on soil pH, limited annual precipitation, and the flat terrain. Elevated concentrations would likely be limited to surface soils in the immediate area of projectile impact. Effects of contaminants on soils under Alternative 1 would be long-term. The effects would be localized to the range areas, but more widespread than the No Action Alternative. Elevated concentrations of lead in soils would not represent a substantial threat of a release to an off-range area that poses unacceptable risk to human health or the environment. The potential for a release to off-range areas would continue to be assessed every five years under the Army's Operational Range Assessment Program and applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual* (U.S. Army Environmental Center 2005) would be used to manage the new ranges. There would be no significant impacts on soils from possible contamination under Alternative 1.

3.1.3.3 Alternative 2

3.1.3.3.1 Ground Disturbing Activities

Construction Activities

Site excavation, grading, and equipment operations during construction of the proposed range enhancements for Alternative 2 would result in temporary disturbances to the ground surface (Table 2-5 and Figure 2-9). The area of disturbance for individual construction projects would range from less than 1 to 30 ac. (less than 0.4 to 12 ha). The total area of disturbance would be about 65 ac. (26 ha), 25 ac. (10 ha) of which have been previously disturbed (mostly consisting of existing gravel or dirt roads) (Table 2-5). Koehler soils would be the primary soil type affected (Figure 3.1-2). Approximately 40 ac. (16 ha) of previously undisturbed soils would be affected, about 25 ac. (10 ha) would be permanently converted to development, and about 15 ac. (6 ha) would be temporarily disturbed and revegetated. Construction activities for the range enhancements would be spaced out over a period of several years as funding becomes available. Therefore, the total area of disturbance at any given time during construction would be much less than 65 ac. (26 ha).

Under Alternative 2, a second CLFR (western CLFR) would be constructed, and the Joint-Use Range Operations Support Center would be constructed as a standalone building. However, the DMPTR would not be constructed under Alternative 2. Therefore, the total area of disturbance for Alternative 2

(65 ac. [26 ha]) would be 27 ac. (11 ha) less than the total area of disturbance for Alternative 1 (92 ac. [37 ha]). The area permanently converted to development under Alternative 2 would be 24 ac. (10 ha) less than Alternative 1 (from 49 ac. [20 ha] to 25 ac. [10 ha]). Construction of the western CLFR would include placement of additional gravel on about 12 ac. (4.9 ha) of existing gravel road. Therefore, the acreage of previously disturbed areas affected by Alternative 2 would increase to 25 ac. (10 ha) compared to 13 ac. (5 ha) under Alternative 1. Previously undisturbed soils would not be affected by the western CLFR. Impacts on soils under Alternative 2 would be similar to those described for Alternative 1 and would include increased susceptibility to erosion, compaction, and alteration of natural soil profiles. However, the overall disturbance footprint would be smaller for Alternative 2. MPs for Alternatives 1 and 2 would be the same and would include implementation of measures to avoid and minimize wind and water erosion in accordance with the Oregon Department of Environmental Quality *Erosion and Sediment Control Manual* (Oregon Department of Environmental Quality 2005) and implementation of the *Post-construction Habitat Restoration Plan* (Appendix F, Additional Biological Information).

Portions of the drop zone, eastern CLFR, and western CLFR are the only Alternative 2 proposed range enhancements that would be sited on soils classified as prime farmland or farmland of statewide importance (Figure 3.1-3, Table 3.1-1). No construction or development would be required for the drop zone. Establishing the eastern CLFR and western CLFR would involve placement of gravel on existing dirt roads and establishment of temporary target emplacements. These activities would not irreversibly convert soils that are classified as prime farmland or farmland of statewide importance.

Construction activities under Alternative 2 would result in long-term minor effects on soils in the form of conversion to development, erosion, compaction, and alteration of natural soil profiles and structure. The effects would be localized and the total area of disturbance would be 27 ac. (11 ha) smaller than Alternative 1. The area permanently converted to development would be small relative to the total land area at NWSTF Boardman (about 0.05 percent). There would be no significant impacts on soils from construction activities under Alternative 2.

Training Activities

Training activities on the new ranges under Alternative 2 would result in additional ground disturbance compared to the No Action Alternative, but ground disturbance would be lower relative to Alternative 1. Soils around targets on the MPMGR and eastern CLFR would be disturbed by non-explosive practice munitions striking the ground under Alternative 2. Additional ground disturbance would also result from non-explosive practice munitions impacts and placement or relocation of targets along the western CLFR. However, the overall area of disturbance associated with non-explosive practice munitions would decrease because the DMPTR would not be constructed and operated under Alternative 2. Some of the areas affected on the MPMGR would coincide with areas temporarily disturbed during construction. Vehicle and equipment use would increase substantially under Alternative 2 compared to the No Action Alternative during ground-based training events, but would decrease compared to Alternative 1 because the DMPTR would not be constructed and operated. In particular, training with heavy equipment such as the Abrams tank would not normally occur under Alternative 2 because the DMPTR would not exist. Vehicles would continue to use existing roads or new gravel roads constructed under Alternative 2. No maneuver training off of these roads is proposed. Disturbed areas would be susceptible to erosion. Ground disturbance from training activities under Alternative 2 would result in long-term minor effects to soils in the form of increased potential for erosion, compaction, and alteration of natural soil profiles and structure. The effects would be localized, but more widespread than the No Action Alternative. There would be no significant impacts on soils from training activities under Alternative 2.

Maintenance Activities

Maintenance activities around targets in the Main Target Area and fire break maintenance activities under Alternative 2 would be the same as those described for Alternative 1. Therefore, the analysis presented above for Alternative 1 also applies to Alternative 2. The proposed modifications to the fire break system (Figure 3.13-3) could result in long-term benefits to soils at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would reduce the potential for soil erosion.

Indirect Effects of Increased Wildfire Risk

As discussed in Section 3.13 (Wildfire), the proposed increases in training at NWSTF Boardman could increase the risk of wildfire. To address this issue, the Navy and ORNG prepared a *Draft Integrated Wildland Fire Management Plan*, which contains a Fire Danger Rating and Wildland Fire Risk Management Matrix. Specifics regarding implementation of the Plan are provided in Section 3.13 (Wildfire) and Appendix H (Draft Integrated Wildfire Management Plan). Soil erosion could occur indirectly from fire-caused decreases in vegetation cover and biological soil crust. However, the additional fire protection measures and resources that would be put in place under Alternative 2 would mitigate the increased fire risk (see Section 3.13, Wildfire) and avoid or minimize potential indirect effects to soils. Overall wildfire risk would be lower under Alternative 2 compared to Alternative 1 because the DMPTR would not be constructed and operated.

3.1.3.3.2 Potential Soil Contamination

The potential for incidental spills that could contaminate soils would increase under Alternative 2 compared to the No Action Alternative because additional ground vehicles would be operated. Most ORNG ground vehicles used under Alternative 2 would be refueled offsite, but it might be necessary to occasionally refuel some vehicles in the field using tanker trucks and portable secondary containment devices. Refueling requirements for Alternative 2 would decrease compared to Alternative 1 because the DMPTR would not be constructed and operated. Most of the refueling required for Alternative 1 would be associated with training on the DMPTR. Risk of a spill contaminating soils is considered negligible based on existing standard operating procedures, periodic spill response training, and use of secondary containment during refueling.

Potential impacts on soils from non-explosive practice munitions under Alternative 2 would decrease compared to Alternative 1 because the DMPTR would not be constructed and operated, and the non-explosive practice rounds associated with the DMPTR would not be expended at NWSTF Boardman. Other differences between Alternatives 1 and 2 would include expenditure of approximately 1,440 non-explosive practice mortar rounds per year under Alternative 2. These rounds would be recovered by the participating units for eventual reuse. Therefore, practice mortar rounds would not have a long-term impact on soils. In addition, the western CLFR would be established, and approximately 50 percent of the CLFR training events would shift from the eastern CLFR to the western CLFR under Alternative 2. The total number of CLFR events and number of rounds expended would not change compared to Alternative 1, but the footprint of possible soil lead contamination would increase for CLFR training. The overall footprint for Alternative 2 would be smaller than Alternative 1 and the total number of lead-containing rounds expended per year would decrease by about 54 percent under Alternative 2 (see Table 3.3-1) because the DMPTR would not exist.

As discussed for the No Action Alternative and Alternative 1, lead would be expected to have limited mobility based on neutral to alkaline soil pH, limited precipitation, and flat terrain at NWSTF Boardman.

As shown in Figure 3.1-2, the proposed western CLFR would be sited on Koehler, Quincy, and Sagehill soils, with pH values in the range of 7.3 to 7.9 (Table 3.1-1). Lead precipitates out of solution and binds to the soil within these pH ranges, preventing or limiting migration to the subsurface (Dermatas 2004, U.S. Environmental Protection Agency 2005). The flat terrain on the proposed ranges coupled with low precipitation also makes it unlikely that lead would be transported outside the immediate target area by stormwater runoff. Surface soils containing lead would likely be transported by wind on the range to some degree under Alternative 2. However, an off-range release of lead by wind that poses unacceptable risk to human health or the environment is unlikely because concentrated sources, such as a small arms range berms, would not present on the new ranges. The potential for off-range release would be minimized by the distance of the new ranges to the NWSTF Boardman boundary (approximately 0.5–1.0 mi. [0.8–1.6 km]). In addition, MPs would be implemented to minimize lead migration.

Effects of contaminants on soils under Alternative 2 would be long-term and similar to those described for Alternative 1. The effects would be localized to the range areas, but more widespread than the No Action Alternative. New areas associated with the western CLFR would be affected, but the total area affected would decrease compared to Alternative 1 because the DMPTR would not exist. Elevated concentrations of lead in soils would not represent a substantial threat of a release to an off-range area that poses an unacceptable risk to human health or the environment. The potential for a release to off-range areas would continue to be assessed every 5 years under the Army's Operational Range Assessment Program and applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual* (U.S. Army Environmental Center 2005) would be used to manage the new ranges. There would be no significant impacts on soils from possible contamination under Alternative 2.

3.1.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.1.3.4.1 Proposed Best Management Practices

The current MPs listed in Section 3.1.2.3 (Current Requirements and Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following MPs would be implemented to avoid and minimize potential impacts to soils under Alternatives 1 and 2:

- Applicable erosion control measures would be implemented during construction to avoid and minimize the potential for wind and water erosion in accordance with the Oregon Department of Environmental Quality *Erosion and Sediment Control Manual* (Oregon Department of Environmental Quality 2005).
- A *Post-construction Habitat Restoration Plan* (Appendix F, Additional Biological Information) would be implemented following construction to reduce soil erosion.
- An *Integrated Wildland Fire Management Plan* (Appendix H, Draft Integrated Wildlife Management Plan) would be implemented to avoid and minimize impacts associated with wildfire, including the indirect effects of soil erosion after a fire. In addition to other fire protection measures, the Plan includes proposed modifications to the existing system of fire breaks (Figure 3.13-3). The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible. The proposed modifications to the fire break system (Figure 3.13-3) could result in long-term benefits to soils at NWSTF Boardman by

restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would reduce the potential for soil erosion.

- Incidental fuel spills would be avoided during construction and training by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- A Spill Prevention, Control, and Countermeasures Plan would be developed if quantities of fuel and other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored at NWSTF Boardman or a HEMTT or fuel tanker truck were parked on NWSTF Boardman. The Plan would help to ensure rapid and effective response to incidental spills and avoid contaminant migration to groundwater.
- Any spills would be managed and cleaned up in accordance with Oregon Army National Guard Regulation 420-47; a Spill Prevention, Control, and Countermeasures Plan, if deemed necessary; AR 200-1; and applicable state and federal regulatory requirements. If the ORNG is unable to contain a spill or the spill exceeded 42 gallons (158.9 liters) of regulated material, the event would be immediately reported to the Oregon Emergency Response System.
- The NWSTF Boardman *Operational Range Clearance Plan* would be updated and implemented to address requirements for the new ranges.
- Under the Navy's RSEPA, Range Condition Assessment 5-year Reviews would continue to be conducted and appropriate steps would be taken to analyze environmental conditions on the range and to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose risks to human health or the environment. RSEPA focus would be expanded to incorporate new range activities and new training areas under periodic assessments.
- Assessments would be conducted for the DMPTR (Alternative 1 only), MPMGR, and both CLFRs in accordance with the Army's Operational Range Assessment Program. These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual*.

3.1.3.4.2 Proposed Monitoring

No specific monitoring needs where identified for soils. However, the need for soil sampling, analysis, or monitoring would continue to be considered during Range Condition Assessment Five-Year Reviews conducted under the Navy's RSEPA program and during Operational Range Assessments conducted by ORNG.

3.1.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for soils based on the analysis presented in Section 3.1.3 (Environmental Consequences), implementation of current MPs, and implementation of proposed MPs.

3.1.3.5 Summary of Effects and Conclusions

Table 3.1-2 lists each stressor analyzed for potential impacts on soils at NWSTF Boardman. None of the alternatives would result in significant impacts on soils.

Table 3.1-2: Summary of Impacts on Soils

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	Not applicable. No construction would occur.
Military Training Activities	Long-term minor effects in the form of soil erosion, compaction, and alteration of natural soil profiles and structure. Effects would be localized.
Maintenance Activities	Long-term effects from target and fire break maintenance in the form of soil erosion and alteration of natural soil profiles and structure.
Training-related Wildfire	Not applicable. Wildfire risk would not increase.
Potential Release of Soil or Water Contaminants	
Incidental Spills	The potential for incidental spills is low based on the small quality of petroleum, oil, and lubricants used in the administrative area.
Non-explosive Practice Munitions	Long-term effects in the form of accumulation of non-explosive practice munitions and metals in surface soils. Effects would be localized.
Impact Conclusion	The No Action Alternative would not result in significant impacts on soils.
Alternative 1	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	Long-term minor effects in the form of soil erosion, compaction, and alteration of natural soil profiles and structure. Effects would be localized. Soils classified as prime farmland or farmland of statewide importance would not be irreversibly converted.
Military Training Activities	Long-term minor effects in the form of soil erosion, compaction, and alteration of natural soil profiles and structure. Effects would be localized, but more widespread than the No Action Alternative.
Maintenance Activities	Proposed modifications to the fire break system could result in long-term benefits to soils at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would reduce the potential for soil erosion.
Training-related Wildfire	Negligible indirect effects. Increased fire risk would be mitigated by additional fire protection measures and resources.
Potential Release of Soil or Water Contaminants	
Incidental Spills	The potential for incidental spills would increase relative to the No Action Alternative, but would remain low based on implementation of additional management practices.
Non-explosive Practice Munitions	Long-term effects in the form of accumulation of non-explosive practice munitions and metals in surface soils. Effects would be localized, but more widespread than the No Action Alternative.
Impact Conclusion	Alternative 1 would not result in significant impacts on soils.

Table 3.1-2: Summary of Impacts on Soils (continued)

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
Alternative 2	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	Long-term minor effects in the form of soil erosion, compaction, and alteration of natural soil profiles and structure. Effects would be localized, and a smaller area would be affected compared to Alternative 1. Soils classified as prime farmland or farmland of statewide importance would not be irreversibly converted.
Military Training Activities	Long-term minor effects in the form of soil erosion, compaction, and alteration of natural soil profiles and structure. Effects would be localized, more widespread than the No Action Alternative, but less widespread than Alternative 1.
Maintenance Activities	Proposed modifications to the fire break system could result in long-term benefits to soils at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would reduce the potential for soil erosion.
Training-related Wildfire	Negligible indirect effects. Increased fire risk would be mitigated by additional fire protection measures and resources.
Potential Release of Soil or Water Contaminants	
Incidental Spills	The potential for incidental spills would increase relative to the No Action Alternative, but would remain low based on implementation of additional management practices. Potential for spills would be lower than Alternative 1.
Non-explosive Practice Munitions	Long-term effects in the form of accumulation of non-explosive practice munitions and metals in surface soils. Effects would be localized, more widespread than the No Action Alternative, but less widespread than Alternative 1.
Impact Conclusion	Alternative 2 would not result in significant impacts on soils.

Notes: NWSTF = Naval Weapons Systems Training Facility, ac. = acres, ha = hectares

3.2 AIR QUALITY

3.2.1 INTRODUCTION

3.2.1.1 Overview

Morrow County and Naval Weapons Systems Training Facility (NWSTF) Boardman are located in the Eastern Oregon Intrastate Air Quality Control Region 191, which includes the following Oregon counties: Baker, Gilliam, Grant, Harney, Malheur, Morrow, Umatilla, Union, Wallowa, and Wheeler. Therefore, the Eastern Oregon Intrastate Air Quality Control Region 191 is considered the study area or region of influence for the air quality analysis. The following section provides the regulatory framework for air quality and contains general information and definitions of terms commonly used in this section.

3.2.1.2 Regulatory Framework

The United States (U.S.) Environmental Protection Agency (EPA) is responsible for enforcing the Clean Air Act (CAA) of 1970 and its 1977 and 1990 amendments (42 United States Code §7401, *et seq.)*. The purposes of the CAA are to classify air basins as to their attainment status under the National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [C.F.R.] § 50), to develop schedules and strategies to meet the NAAQS, and to regulate emissions of criteria pollutants and air toxics to protect the public health and welfare.

Criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), suspended particulate matter less than or equal to 10 micrometer (µm) in diameter (PM_{10}), fine particulate matter less than or equal to 2.5 µm in diameter ($PM_{2.5}$), and lead (Pb). Air basins that exceed a NAAQS are designated as “nonattainment” for that pollutant, while air basins that are in compliance with a NAAQS are in “attainment” for that pollutant. Nonattainment areas are required by the U.S. EPA to develop and execute a State Implementation Plan that describes actions that will lead the state into compliance with all federal air quality standards. Areas that have achieved attainment may be designated as “maintenance areas,” which are subject to maintenance plans showing how the area will continue to meet federal air quality standards. Non-criteria air pollutants that can affect human health are categorized as hazardous air pollutants under Section 112 of the CAA. The U.S. EPA has identified 188 hazardous air pollutants, such as benzene, perchloroethylene, and methylene chloride. Hazardous air pollutants are examined individually where there is a source of these pollutants.

Section 176 (c)(1) of the CAA, commonly known as the General Conformity Rule (conformity), requires federal agencies to ensure that their actions conform to applicable implementation plans for achieving and maintaining NAAQS for criteria pollutants. To ensure conformity, a federal action must not contribute to new violations of ambient air quality standards, increase the frequency or severity of existing violations, or delay timely state or regional attainment of standards. A conformity review must be completed for every federal action that generates air emissions in nonattainment or maintenance (former non-attainment) areas. The General Conformity Rule does not apply to the Proposed Action because the study area is not within a nonattainment or maintenance area.

Air pollutants are classified as either primary or secondary pollutants. Primary air pollutants are those emitted directly into the atmosphere, such as CO, SO_2, Pb, and particulate matter. Secondary air pollutants, such as O_3, are those formed through atmospheric chemical reactions. Such reactions usually involve primary air pollutants and normal constituents of the atmosphere. Sunlight and meteorological conditions, such as temperature and humidity, also can affect atmospheric chemistry. Air pollutants such as organic gases and particulate matter are a combination of primary and secondary pollutants. PM_{10} and $PM_{2.5}$ are generated as primary pollutants by various mechanical processes (e.g., abrasion, erosion, mixing, or atomization) or combustion processes. PM_{10} and $PM_{2.5}$ also can be formed as secondary pollutants, however, through chemical reactions or by the condensation of gaseous pollutants into fine aerosols.

Compounds that react to form secondary air pollutants, such as O_3, are called pollutant precursors. Precursors for O_3 fall into two broad groups of chemicals: nitrogen oxides (NO_X) and organic compounds. NO_X consists of nitric oxide and NO_2. Organic compound precursors of O_3 are routinely described by a number of different terms, including volatile organic compounds, reactive organic compounds, and reactive organic gases. The latter term, reactive organic gases, is used in this document to refer to organic compound precursors of O_3.

Air pollutant emissions refer to the amount (weight or volume) of one or more specific compounds emitted into the atmosphere by a source. Most air pollutant emissions are expressed as a rate (e.g., pounds [lb.] per hour, pounds per day, or tons per year). Typical measurement units for emission rates on a source activity basis include pounds per thousand gallons of fuel burned, pounds per ton of material processed, and grams per vehicle-mile of travel.

Ambient air quality is determined by the atmospheric concentrations of specific air pollutants at a particular time and location. The ambient air pollutant concentrations measured at a particular location are determined by the pollutant emissions rate, local meteorology, and atmospheric chemistry. Wind speed and direction and precipitation patterns affect the dispersal, dilution, and removal of air pollutant emissions. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction (e.g., parts per million by volume).

3.2.1.3 Determination of Significance

The impact analysis for air quality considered possible changes in ambient air quality that could result from the Proposed Action. Such changes could arise from air pollutant emissions associated with increases in military readiness activities (e.g., combustion emissions from aircraft, vehicles, and equipment). Factors used in determining if impacts on air quality would be significant include the increase in air pollutant emissions from the Proposed Action relative to the Eastern Oregon Intrastate Air Quality Control Region 191 baseline emissions.

3.2.2 AFFECTED ENVIRONMENT

3.2.2.1 Regional and Local Air Quality

The Oregon Department of Environmental Quality monitors criteria air pollutants through a network of air quality monitoring sites throughout the state. Based upon data collected from these monitoring sites, the U.S. EPA prepares annual summaries of local air quality that identify those areas that exceed NAAQS for one or more air pollutants. Geographic areas that have not consistently met the NAAQS are designated as nonattainment areas. Maintenance areas are geographic areas that had a history of nonattainment, but are now consistently meeting NAAQS and have a maintenance plan (see Section 3.2.1.2, Regulatory Framework, for additional details).

The Eastern Oregon Intrastate Air Quality Control Region 191 generally has good air quality, as indicated by the lack of nonattainment areas in the region. Morrow County and NWSTF Boardman are not located in a nonattainment or maintenance area. Currently, only three areas in Oregon are designated as nonattainment areas, all for particulate matter: Klamath Falls, Oakridge, and Eugene/Springfield. The closest maintenance area to NWSTF Boardman is La Grande, approximately 100 miles (mi.) (161 kilometers [km]) east/southeast of NWSTF Boardman (Oregon Department of Environmental Quality 2011a).

The Air Quality Index is a health index that normalizes the various air pollutants in order to report one health level. In 2010, the Air Quality Index for Hermiston, which is located about 25 mi. (40.2 km) east of NWSTF Boardman, was in the “good” category on 93 percent of the days for which a value was calculated and in the “moderate” category on the remaining days (Oregon Department of Environmental Quality 2011b). The most recent air emissions inventory data that are available for Morrow County and the Eastern Oregon Intrastate Air Quality Control Regional 191 are from 2002 (Table 3.2-1).

Table 3.2-1: Annual Baseline (2002) Criteria and Precursor Air Pollutant Emissions for Morrow County, Oregon and Eastern Oregon Intrastate Air Quality Control Region 191

Geographic Area	Criteria and Precursor Air Pollutant Emissions in Tons/Year[1]					
	CO	NO_x	HC[1]	SO_x	PM_{10}	$PM_{2.5}$
Morrow County	13,359	10,695	3,004	12,379	6,633	1,418
Eastern Oregon Intrastate Air Quality Control Region 191	364,171	36,845	77,011	16,037	67,991	25,559

[1] Presented as volatile organic compounds in U.S. Environmental Protection Agency 2008

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, HC = total hydrocarbons, SO_x = sulfur oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter.

Source: U.S. Environmental Protection Agency 2008

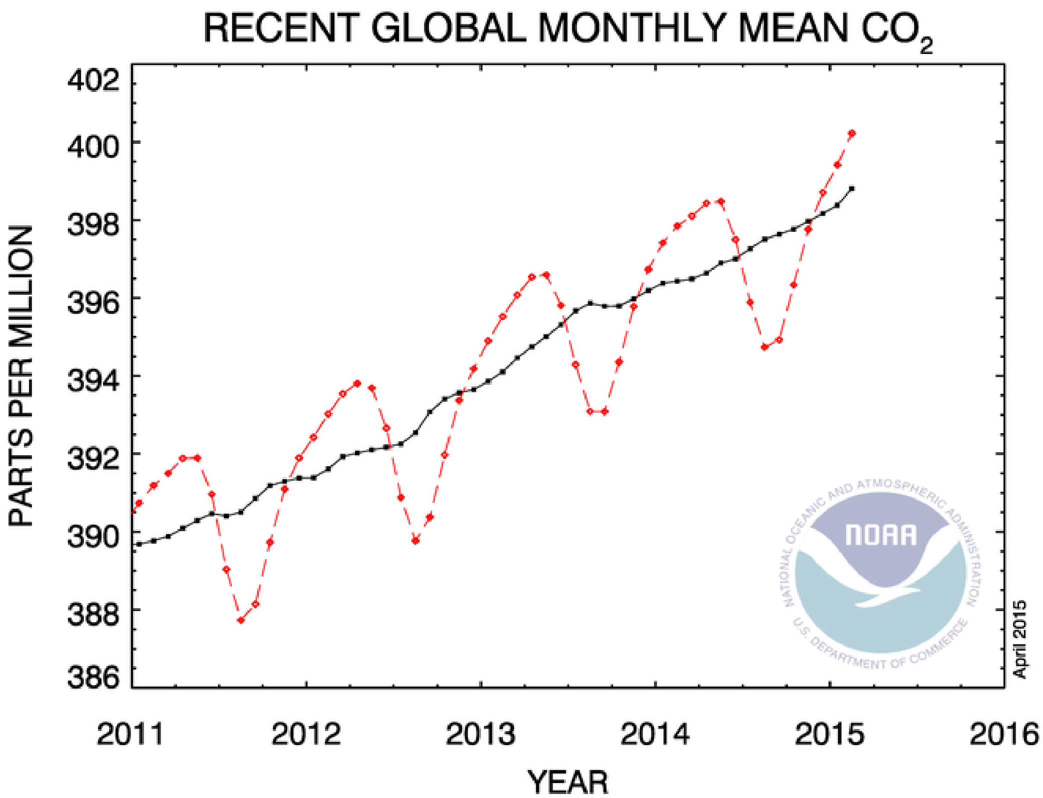
3.2.2.2 Existing Air Pollutant Emissions at NWSTF Boardman

Air pollutant emissions at NWSTF Boardman primarily originate from mobile sources, with the main source being fixed-wing aircraft overflights in the Special Use Airspace. Other sources include helicopters, Unmanned Aircraft Systems, and military ground vehicles and equipment.

The only stationary air pollution source at NWSTF Boardman is an emergency generator, which is located in the Administration Area (U.S. Department of the Navy 2011). No air pollution sources are located on the range itself. Emergency generators are excluded from the minor sources required to obtain permits under Oregon Department of Environmental Quality regulations (Oregon Administrative Rules 340-216-0020).

3.2.2.3 Climate Change

Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. Global warming refers to the recent and ongoing rise in global average temperature near Earth's surface. Global warming causes climate patterns to change. However, global warming itself represents only one aspect of climate change (U.S. Environmental Protection Agency 2013). Global surface temperatures have increased by an average of about 1.3 degrees Fahrenheit (°F) during the last century (Solomon et al. 2007). Global warming and climate change have been attributed to many factors, including increasing atmospheric concentrations of CO_2, NO_2, methane, and other greenhouse gases. Figure 3.2-1 illustrates the global increase in CO_2 concentration over the past 5 years (Department of Commerce 2015). Most of the observed temperature increase since the mid-20th century is correlated with increasing amounts of greenhouse gases emitted by human activities, such as combustion of fossil fuels and deforestation (Solomon et al. 2007).



Notes: The dashed red line with diamond symbols represents the monthly mean values, centered on the middle of each month. The black line with the square symbols represents the same, after correction for the average seasonal cycle.
Source: Department of Commerce 2015

Figure 3.2-1: Recent CO_2 Global Trend

The greenhouse gas effect is the process by which certain gases in the atmosphere allow long-wave radiation in, but also keep short-wave radiation from escaping, which then warms the planet's lower atmosphere and surface. Greenhouse gases are transparent to long-wave radiation from the sun; this radiation passes through the atmosphere without being absorbed or reflected, and warms the earth's surface. Greenhouse gases trap short-wave (infrared) radiation emitted by the earth's surface, however, preventing it from dissipating into space and causing it to re-radiate down to the surface of the earth. The existence of the greenhouse effect is not disputed. The issues and interrelationship between these issues that are not clearly defined include how the strength of the greenhouse effect changes with different concentrations of greenhouse gases, the relationships among natural sources and sinks of greenhouse gases, human sources of greenhouse gases, and atmospheric concentrations of greenhouse gases. Climate processes are understood at a general level and more research is needed before impacts may be clearly defined.

CO_2 is the major greenhouse gas emitted by human activities, primarily from the combustion of fossil fuels such as coal, oil, and natural gas. Atmospheric concentrations of CO_2 have increased by 36 percent since the mid-1700s (U.S. Environmental Protection Agency 2010). This level is much higher than at any time during the last 650,000 years (Canadell et al. 2007). Less direct geological evidence indicates that

CO_2 values this high were last seen about 20 million years ago (Pearson and Palmer 2000). The burning of fossil fuel has produced about 75 percent of the increase in CO_2 from human activity over the past 20 years. The potential effects of proposed greenhouse gas emissions are by nature global and may result in cumulative impacts, as individual sources of greenhouse gas emissions are not large enough to have any noticeable effect on climate change. Therefore, the impact of proposed greenhouse gas emissions to climate change is discussed in the context of cumulative impacts in Chapter 4 (Cumulative Impacts).

3.2.2.4 Current Requirements and Management Practices

Equipment used by military units in the study area, including aircraft and vehicles, are properly maintained in accordance with applicable Navy and Oregon National Guard (ORNG) requirements. Operating equipment meets federal and state emission standards, where applicable.

3.2.3 Environmental Consequences

3.2.3.1 No Action Alternative

3.2.3.1.1 Air Pollutant Emissions Associated with Construction Activities

The No Action Alternative does not include construction activities.

3.2.3.1.2 Air Pollutant Emissions Associated with Training and Testing Activities

Criteria Pollutants

Table 3.2-2 lists criteria air pollutant and precursor emissions in the NWSTF Boardman Study Area from the No Action Alternative. Emissions are totaled for each major source component (i.e., aircraft, munitions, and military vehicles and equipment). The air pollutants emitted in the greatest quantity are NO_x, PM_{10}, CO, and $PM_{2.5}$, with fixed-wing aircraft contributing the largest amounts. All emissions calculations are provided in Appendix D (Air Quality Summaries).

Table 3.2-2: Annual Criteria and Precursor Air Pollutant Emissions for Training and Testing under the No Action Alternative

Emissions Source	Criteria and Precursor Air Pollutant Emissions in Tons/Year						
	CO	NO_x	HC	SO_x	PM_{10}	$PM_{2.5}$	Pb
Aircraft	15	31	2	7	29	15	-[1]
Munitions	0.05	0.01	-[1]	-[1]	0.02	0.01	0.0001
Military Vehicles and Equipment	1	2	<0.01	-[1]	<0.01	<0.01	-[1]
Total All Sources =	**16**	**33**	**2**	**7**	**29**	**15**	**0.0001**
No Action Alternative emissions as a percentage of Morrow County baseline (2002)	0.12%	0.31%	0.08%	0.05%	0.43%	1.06%	-
No Action Alternative emissions as a percentage of Air Quality Control Region 191 baseline	0.004%	0.089%	0.003%	0.042%	0.042%	0.059%	-

[1] Not applicable because the source produces insignificant amount of this pollutant.
Notes: CO = carbon monoxide, NO_x = nitrogen oxides, HC = total hydrocarbons, SO_x sulfur oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, Pb = lead

Under the No Action Alternative, training and testing activities and associated criteria air pollutant emissions would not change. Air quality in the Eastern Oregon Intrastate Air Quality Control Region 191 would not change as a result of the No Action Alternative and would still be generally characterized as good. Criteria air pollutant emissions associated with training and testing activities would have a negligible effect on air quality under the No Action Alternative because changes to air quality would not be detectable and would be below or within historical or desired air quality conditions. Criteria air pollutant emissions associated with the No Action Alternative would have no significant impact on air quality.

Hazardous Air Pollutants

The U.S. EPA has listed 188 hazardous air pollutants regulated under Title III (Hazardous Air Pollutants), Section 112(g) of the CAA. Hazardous air pollutants are emitted by processes associated with the No Action Alternative, including fuel combustion. Trace amounts of hazardous air pollutants are emitted by combustion sources participating in training and testing activities, including aircraft, munitions, and military vehicles and equipment. The amounts of hazardous air pollutants emitted are small compared to the emissions of criteria pollutants; emission factors for most hazardous air pollutants from combustion sources are roughly three or more orders of magnitude lower than emission factors for criteria pollutants (California Air Resources Board 2007). Emissions of hazardous air pollutants from munitions use are smaller still, with emission factors ranging from roughly 10^{-5} to 10^{-15} lb. of individual hazardous air pollutants per item for cartridges to 10^{-4} to 10^{-13} lb. of individual hazardous air pollutants per item for mines and smoke canisters (U.S. Environmental Protection Agency 2009). As an example, 10^{-5} is equivalent to 0.0001 and 10^{-15} is equivalent to 0.00000000000001. Hazardous air pollutant emissions estimates were not calculated because of the small amounts that would be emitted. As discussed in Soils (Section 3.1), surface soils containing lead are likely transported on the range to some degree. However, an off-range release of lead by wind that poses unacceptable risk to human health or the environment is unlikely.

Under the No Action Alternative, training and testing activities and associated hazardous air pollutant emissions would not change. Hazardous air pollutants emissions would be intermittent and distributed over the entire NWSTF Boardman Study Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is unlikely that the No Action Alternative would result in detectable concentrations of hazardous air pollutants. The effects of hazardous air pollutant emissions under the No Action Alternative would be negligible and there would be no significant impacts on air quality.

Fugitive Dust

Ground-based training activities would be very limited under the No Action Alternative and generation of fugitive dust would be negligible. Fugitive dust from training activities would have no significant impact on air quality under the No Action Alternative.

3.2.3.2 Alternative 1

3.2.3.2.1 Air Pollutant Emissions Associated with Construction Activities

Construction of the proposed range enhancements under Alternative 1 would generate fugitive dust from activities such as grading. Operation of construction equipment would also result in combustion emissions such as CO, NO_x, Volatile Organic Compounds, and PM_{10}. These emissions would make a minimal contribution to overall air pollutant loadings in the region and would not be expected to affect the status of the air quality in the Eastern Oregon Intrastate Air Quality Control Region 191 for the following reasons:

- The emissions would be temporary because construction activities would end when the range enhancements are completed.
- The emissions would be intermittent because construction activities would occur only during normal working hours and the various construction projects would be implemented over a period of several years.
- Periodic watering/wetting of construction sites would be employed as necessary to minimize generation and downwind migration of fugitive dust, especially on dry, windy days and in disturbed areas where construction equipment is being used.

Based on the minimal contribution to overall air pollutant loadings in the region, estimates of air pollutant emissions from construction activities were not calculated. Air pollutant emissions associated with construction activities under Alternative 1 would be short-term, intermittent, and localized and would not be expected to affect the status of the air quality in the Eastern Oregon Intrastate Air Quality Control Region 191. Construction activities under Alternative 1 would have no significant impact on air quality.

3.2.3.2.2 Air Pollutant Emissions Associated with Training and Testing Activities

Criteria Pollutants

Table 3.2-3 lists criteria air pollutant and precursor emissions in the NWSTF Boardman Study Area from Alternative 1. Emissions are totaled for each major source component (i.e., aircraft, munitions, and military vehicles and equipment). The air pollutants emitted in the greatest quantity are NO_x, PM_{10}, CO, and $PM_{2.5}$. Vehicles and equipment would contribute the largest amounts of NO_x and CO. Fixed-wing aircraft would contribute the largest amounts of PM_{10} and $PM_{2.5}$. All emissions calculations are provided in Appendix D (Air Quality Summaries).

All criteria and precursor pollutant emissions would increase under Alternative 1 compared to the No Action Alternative. The increases would be attributable to the increased fixed-wing aircraft use (from 847 sorties to 1,627 sorties per year) and the increased ground vehicle use associated with training activities on the new ranges. The largest increase is predicted for NO_x, which is an O_3 precursor and would increase by 657 tons per year. Given the attainment status of Air Quality Control Region 191 and the small increase in emissions relative to the Air Quality Control Region 191's baseline, there would be no significant impact on air quality as a result of the implementation of Alternative 1.

Table 3.2-3: Annual Criteria and Precursor Air Pollutant Emissions for Training and Testing under Alternative 1 Compared to the No Action Alternative

Emissions Source	Criteria and Precursor Air Pollutant Emissions in Tons/Year						
	CO	NO_x	HC	SO_x	PM_{10}	$PM_{2.5}$	Pb
Alternative 1							
Aircraft	9	148	1	21	64	32	-[1]
Munitions	2.6	0.44	-[1]	-[1]	1.48	0.74	0.01
Military vehicles and equipment	61	542	14	-[1]	11	5.5	-[1]
Alternative 1 Total =	**73**	**690**	**15**	**21**	**76**	**38**	**0.01**
No Action Alternative							
Aircraft	15	31	2	7	29	15	-[1]
Munitions	0.05	0.01	-[1]	-[1]	0.02	0.01	0.0001
Military vehicles and equipment	1	2	<0.01	-[1]	<0.01	<0.01	-[1]
No Action Alternative Total =	**16**	**33**	**2**	**7**	**29**	**15**	**0.0001**
Summary and Comparison							
Change in emissions from No Action Alternative	57	657	13	14	48	23	0.01
Alternative 1 emissions as a percentage of Morrow County baseline (2002)	0.54%	6.46%	0.50%	0.17%	1.15%	2.68%	-
Alternative 1 emissions as a percentage of Air Quality Control Region 191 baseline	0.020%	1.874%	0.019%	0.131%	0.112%	0.149%	-

[1] Not applicable because the source produces insignificant amounts of this pollutant.
Notes: CO = carbon monoxide, NO_x = nitrogen oxides, HC = total hydrocarbons, SO_x = sulfur oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, Pb = lead

Hazardous Air Pollutants

As discussed for the No Action Alternative, hazardous air pollutants are emitted by processes associated with Alternative 1, including fuel combustion. Trace amounts of hazardous air pollutants are emitted by combustion sources participating in training and testing activities, including aircraft, munitions, and military vehicles and equipment. Hazardous pollutant emissions would increase under Alternative 1 and the increases would be roughly proportional to the increases observed for the criteria air pollutants emitted (Table 3.2-3). As discussed in Soils (Section 3.1), surface soils containing lead would likely be transported on the range to some degree under Alternative 1. However, an off-range release of lead by wind that poses unacceptable risk to human health or the environment is unlikely.

Hazardous air pollutants emissions would continue to be intermittent and distributed over the entire NWSTF Boardman Study Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is possible that hazardous pollutants would be measurable, but they would be in very low concentrations and would not affect the air quality in the Eastern Oregon Intrastate Air Quality Control Region 191. The effects of hazardous air pollutant emissions from training and testing activities under Alternative 1 would be long-term and localized. There would be no significant impact on air quality.

Fugitive Dust

The potential for fugitive dust to be generated would increase substantially under Alternative 1 because additional ground-based activities would take place using wheeled and tracked vehicles (Abrams tank and Bradley fighting vehicle). While off-road maneuver training is not proposed, operation of military vehicles on gravel roads within the Digital Multipurpose Training Range (DMPTR) and Convoy Live Fire Range (CLFR) would generate dust during dry conditions. Generation of dust would be minimized by placing and maintaining crushed rock or gravel on the road surfaces. In addition, conditions would be evaluated prior to starting a training event and water or another dust palliative product would be used to minimize dust, if warranted. Implementing this management practice (MP) would ensure that fugitive dust does not result in significant impacts on air quality.

3.2.3.3 Alternative 2

3.2.3.3.1 Air Pollutant Emissions Associated with Construction Activities

Under Alternative 2, the DMPTR would not be constructed, but a second CLFR (western CLFR) would be established and the Joint-Use Range Operations and Control Center would be built as a standalone building. Therefore, overall emissions associated with construction would be lower compared to Alternative 1. Similar to Alternative 1, air pollutant emissions associated with construction activities under Alternative 2 would be short-term, intermittent, and localized and would not be expected to affect the status of the air quality in the Eastern Oregon Intrastate Air Quality Control Region 191. Construction activities under Alternative 2 would have no significant impact on air quality.

3.2.3.3.2 Air Pollutant Emissions Associated with Training and Testing Activities

Criteria Pollutants

Table 3.2-4 lists criteria air pollutant and precursor emissions in the NWSTF Boardman Study Area from Alternative 2. Emissions are totaled for each major source component (i.e., aircraft, munitions, and military vehicles and equipment). The air pollutants emitted in the greatest quantity are NO_x, PM_{10}, CO, and $PM_{2.5}$. Vehicles and equipment would contribute the largest amount of CO. Fixed-wing aircraft would contribute the largest amounts of NO_x, PM_{10}, and $PM_{2.5}$. All emissions calculations are provided in Appendix D (Air Quality Summaries).

All criteria and precursor pollutant emissions would increase under Alternative 2 compared to the No Action Alternative. The increases would be attributable to the increased fixed-wing aircraft use (from 847 sorties to 1,627 sorties per year) and the increased ground vehicle use associated with training activities on the new ranges. The largest increase is predicted for NO_x, which is an O_3 precursor and would increase by 236 tons per year. Given the attainment status of Air Quality Control Region 191 and the small increase in emissions relative to the Air Quality Control Region 191's baseline, there would be no significant impact on air quality as a result of the implementation of Alternative 2.

Hazardous Air Pollutants

As discussed for criteria pollutants, the emissions of hazardous air pollutants under Alternative 2 would increase compared to the No Action Alternative, but would be lower than Alternative 1 because the DMPTR would not be constructed and operated. Hazardous air pollutant emissions would continue to be intermittent and distributed over the entire NWSTF Boardman Study Area. Their concentrations would be further reduced by atmospheric mixing and other dispersion processes. After initial mixing, it is possible that hazardous pollutants would be measurable, but they would be in very low concentrations and would not affect the air quality in the Eastern Oregon Intrastate Air Quality Control Region 191. The effects of hazardous air pollutant emissions from training and testing activities under Alternative 2 would be long-term and localized. There would be no significant impact on air quality.

Table 3.2-4: Annual Criteria and Precursor Air Pollutant Emissions for Training and Testing under Alternative 2 Compared to the No Action Alternative

Emissions Source	Criteria and Precursor Air Pollutant Emissions in Tons/Year						
	CO	NO_x	HC	SO_x	PM_{10}	$PM_{2.5}$	Pb
Alternative 2							
Aircraft	9	148	1	21	64	32	-[1]
Munitions	0.82	0.09	-[1]	-[1]	0.28	0.14	0.001
Military vehicles and equipment	47	121	11	-[1]	4.6	2.3	-[1]
Alternative 2 Total =	**57**	**269**	**12**	**21**	**69**	**34**	**0.001**
No Action Alternative							
Aircraft	15	31	2	7	29	15	-[1]
Munitions	0.05	0.01	-[1]	-[1]	0.02	0.01	0.0001
Military vehicles and equipment	1	2	<0.01	-[1]	<0.01	<0.01	-[1]
No Action Alternative Total =	**16**	**33**	**2**	**7**	**29**	**15**	**0.0001**
Summary and Comparison							
Change in emissions from No Action Alternative	41	236	10	14	40	19	0.001
Alternative 2 emissions as a percentage of Morrow County baseline (2002)	0.43%	2.52%	0.40%	0.17%	1.04%	2.40%	-
Alternative 2 emissions as a percentage of Air Quality Control Region 191 baseline	0.016%	0.730%	0.016%	0.131%	0.101%	0.135%	-

[1] Not applicable because the source produces insignificant amounts of this pollutant.
Notes: CO = carbon monoxide, NO_x = nitrogen oxides, HC = total hydrocarbons, SO_x = sulfur oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter, Pb = lead

Fugitive Dust

Under Alternative 2, fugitive dust would increase compared to the No Action Alternative, but would be lower than Alternative 1 because the DMPTR would not be constructed and operated. Training on the proposed western CLFR would be a new source of dust under Alternative 2. About 50 percent of the CLFR training events conducted on the eastern CLFR under Alternative 1 would be conducted on the western CLFR under Alternative 2; however, the total number of CLFR training events would be the same as Alternative 1 and the amount of dust generated would be approximately the same. Generation of dust would be minimized by placing and maintaining crushed rock or gravel on the road surfaces. In addition, conditions would be evaluated prior to starting a training event and water or another dust palliative product would be used to minimize dust, if warranted. Implementing this MP would ensure that fugitive dust does not result in significant impacts on air quality.

3.2.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.2.3.4.1 Proposed Management Practices

The Navy and the ORNG propose the following MPs to avoid and minimize impacts to air quality under Alternatives 1 and 2:

- Water or another dust palliative product would be employed as necessary to minimize generation and downwind migration of fugitive dust, especially on dry, windy days and in disturbed areas where construction equipment is being used.

- Generation of dust would be minimized by placing and maintaining crushed rock or gravel on the road surfaces that are used for training. In addition, conditions would be evaluated prior to starting a training event and water or another dust palliative product would be used to minimize dust, if warranted.

3.2.3.4.2 Proposed Monitoring

No specific monitoring needs were identified for air quality.

3.2.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for air quality based on the analysis presented in Section 3.2.3 (Environmental Consequences) and implementation of proposed MPs.

3.2.3.5 Summary of Effects and Conclusions

Table 3.2-5 lists each stressor analyzed for potential impacts to air quality at NWSTF Boardman. None of the alternatives would result in significant impacts on air quality.

Table 3.2-5: Summary of Impacts on Air Quality

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative	
Air Pollutant Emissions from Construction Activities	
Criteria Air Pollutant Emissions	Not applicable. No construction is proposed.
Hazardous Air Pollutant Emissions	Not applicable. No construction is proposed.
Fugitive Dust Emissions	Not applicable. No construction is proposed.
Air Pollutant Emissions from Training and Testing Activities	
Criteria Air Pollutant Emissions	Negligible. No change in emissions relative to the Eastern Oregon Intrastate Air Quality Control Region 191 baseline.
Hazardous Air Pollutant Emissions	Negligible. No change in emissions relative to the Eastern Oregon Intrastate Air Quality Control Region 191 baseline.
Fugitive Dust Emissions	Negligible. No change in emissions relative to the Eastern Oregon Intrastate Air Quality Control Region 191 baseline.
Impact Conclusion	The No Action Alternative would not result in significant impacts on air quality.

Table 3.2-5: Summary of Impacts on Air Quality (continued)

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
Alternative 1	
Air Pollutant Emissions from Construction Activities	
Criteria Air Pollutant Emissions	Short-term, minor, and localized effects from construction equipment combustion emissions.
Hazardous Air Pollutant Emissions	Short-term, minor, and localized effects from construction equipment combustion emissions.
Fugitive Dust Emissions	Short-term, minor, and localized effects from dust during ground disturbance. Management practices would minimize dust.
Air Pollutant Emissions from Training and Testing Activities	
Criteria Air Pollutant Emissions	Long-term and localized effects. Small increase in emissions relative to the Eastern Oregon Intrastate Air Quality Control Region 191 baseline.
Hazardous Air Pollutant Emissions	Long-term and localized effects. Small increase in emissions relative to the Eastern Oregon Intrastate Air Quality Control Region 191 baseline.
Fugitive Dust Emissions	Long-term, minor, and localized effects from dust during ground-based training. Management practices would minimize dust.
Impact Conclusion	Alternative 1 would not result in significant impacts on air quality.
Alternative 2	
Air Pollutant Emissions from Construction Activities	
Criteria Air Pollutant Emissions	Short-term, minor, and localized effects from construction equipment combustion emissions. Emissions would be less than Alternative 1.
Hazardous Air Pollutant Emissions	Short-term, minor, and localized effects from construction equipment combustion emissions. Emissions would be less than Alternative 1.
Fugitive Dust Emissions	Short-term, minor, and localized effects from dust during ground disturbance. Management practices would minimize dust. Emissions would be less than Alternative 1.
Air Pollutant Emissions from Training and Testing Activities	
Criteria Air Pollutant Emissions	Long-term and localized effects. Small increase in emissions relative to the Eastern Oregon Intrastate Air Quality Control Region 191 baseline. Emissions would be less than Alternative 1.
Hazardous Air Pollutant Emissions	Long-term and localized effects. Small increase in emissions relative to the Eastern Oregon Intrastate Air Quality Control Region 191 baseline. Emissions would be less than Alternative 1.
Fugitive Dust Emissions	Long-term, minor, and localized effects from dust during ground-based training. Management practices would minimize dust. Emissions would be less than Alternative 1.
Impact Conclusion	Alternative 2 would not result in significant impacts on air quality.

3.3 WATER QUALITY

3.3.1 INTRODUCTION

3.3.1.1 Overview

This section addresses potential impacts on surface water and groundwater. Surface water resources at Naval Weapons Systems Training Facility (NWSTF) Boardman are very limited and no year-round surface waters are present. Therefore, the analysis is focused on groundwater, which is water located beneath the ground surface in soil pore spaces and in the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water. Proposed activities that could directly affect water resources are limited to the land area of NWSTF Boardman. With the exception of Air-to-Ground Bombing Exercises and Air-to-Ground Gunnery Exercises, activities occurring in the Special Use Airspace would not affect water resources and are not considered further in this section.

3.3.1.2 Regulatory Framework and United States Department of the Navy Policy

3.3.1.2.1 Clean Water Act

The Clean Water Act (33 United States [U.S.] Code [U.S.C.] §1251, et seq.) regulates discharges of pollutants in navigable waters of the United States, including discharges of stormwater runoff from construction activities. The U.S. Environmental Protection Agency (EPA) or an authorized state may issue a permit for a discharge only if the discharge complies with Clean Water Act guidelines. The Oregon Department of Environmental Quality issues these permits in Oregon. Proposed construction activities are subject to conditions of the National Pollutant Discharge Elimination System Stormwater Construction General Permit No. 1200-C if they would disturb 1 or more acres (ac.) (0.4 or more hectares [ha]) and may discharge to surface waters or conveyance systems leading to surface waters of the state. The proposed construction under Alternatives 1 and 2 would disturb more than 1 ac. (0.4 ha), but would not result in discharge to surface waters or conveyance systems leading to surface waters of the state. Therefore, a National Pollutant Discharge Elimination System Stormwater Construction General Permit No. 1200-C is not required for the Proposed Action.

3.3.1.2.2 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act is applicable to water resources and is described in Section 3.1.1.2.1 (Resource Conservation and Recovery Act).

3.3.1.2.3 Range Sustainability Environmental Program Assessment

The U.S. Department of the Navy (Navy) Range Sustainability Environmental Program Assessment policy is applicable to water resources and is described in Section 3.1.1.2.3 (Range Sustainability Environmental Program Assessment).

3.3.1.2.4 Operational Range Clearance

The Navy's Operational Range Clearance policy is applicable to water resources and is described in Section 3.1.1.2.4 (Operational Range Clearance).

3.3.1.3 Determination of Significance

The impact analysis for water resources considered possible changes in the quality and quantity of groundwater that could result from the Proposed Action. Such changes could arise from incidental spills, use of non-explosive practice munitions, domestic wastewater disposal, or groundwater withdrawal.

Factors used to determine if impacts on water resources would be significant include (1) the potential for groundwater to become contaminated, (2) whether groundwater represents a substantial threat of a contaminant release to an off-range area, and (3) whether such a release poses unacceptable risk to human health or the environment. In addition, impacts to water resources would be determined significant if groundwater withdrawal were to exceed the long-term natural replenishment of the underground water reservoir.

3.3.2 AFFECTED ENVIRONMENT

3.3.2.1 Surface Water

No year-round surface waters occur on NWSTF Boardman. The only natural surface water occurs as rainfall runoff, creating intermittent flows in Juniper and Well Springs canyons on the south end of NWSTF Boardman (Figure 3.3-1). In some years, the flow is sufficient to leave behind pools of standing water. Natural flow once occurred at Tub, Well, and Strait Springs on the south end of NWSTF Boardman, but all have dried up since domestic wells were drilled south of the property from the 1930s to 1950s (U.S. Department of the Navy 2012). A few small, excavated stock ponds existed at NWSTF Boardman when livestock grazing took place (Figure 3.3-1), however, pumping groundwater to these human-made ponds ceased when the grazing program ended in 2002. Two excavated stock ponds, one at the head of Well Springs Canyon and the other centered over the Oregon Trail east of Juniper Canyon (Oregon Trail Pond), capture seasonal rainwater (Figure 3.3-1). No activities are proposed in any of these areas.

Planning level surveys determined that wetlands do not exist at NWSTF Boardman and hydric soils (soil that formed under conditions of saturation, flooding or ponding) are not present (U.S. Department of the Navy 2012).

No wastewater discharges occur on NWSTF Boardman. Stormwater runoff from range areas would not be expected to reach intermittent drainages. The Columbia River is approximately 2 miles (3.2 kilometers) north of NWSTF Boardman, and in an arid climate with little runoff and porous soil, too distant to be affected by stormwater runoff (U.S. Department of the Navy 2004). Based on this information, the Proposed Action would not affect surface water resources. Therefore, surface water is not addressed in further detail.

3.3.2.2 Groundwater

The Columbia River basalt aquifer underlies NWSTF Boardman. The depth to groundwater varies. For example, in nine wells sampled during 2010 (Figure 3.1-3), the depth to water ranged from 12 to 180 feet (ft.) (3.7 to 54.9 meters [m]) below the ground surface (U.S. Department of the Navy 2011a). The Oregon Water Resources Department has designated Critical Groundwater Areas and Groundwater Limited Areas in the vicinity of NWSTF Boardman (Oregon Water Resources Department 2008). A Critical Groundwater Area is one where pumping of groundwater exceeds the long-term natural replenishment of the underground water reservoir. Additional groundwater pumping in a Groundwater Limited Area is restricted to a few designated uses. These designations are made to prevent excessive declines in groundwater levels.

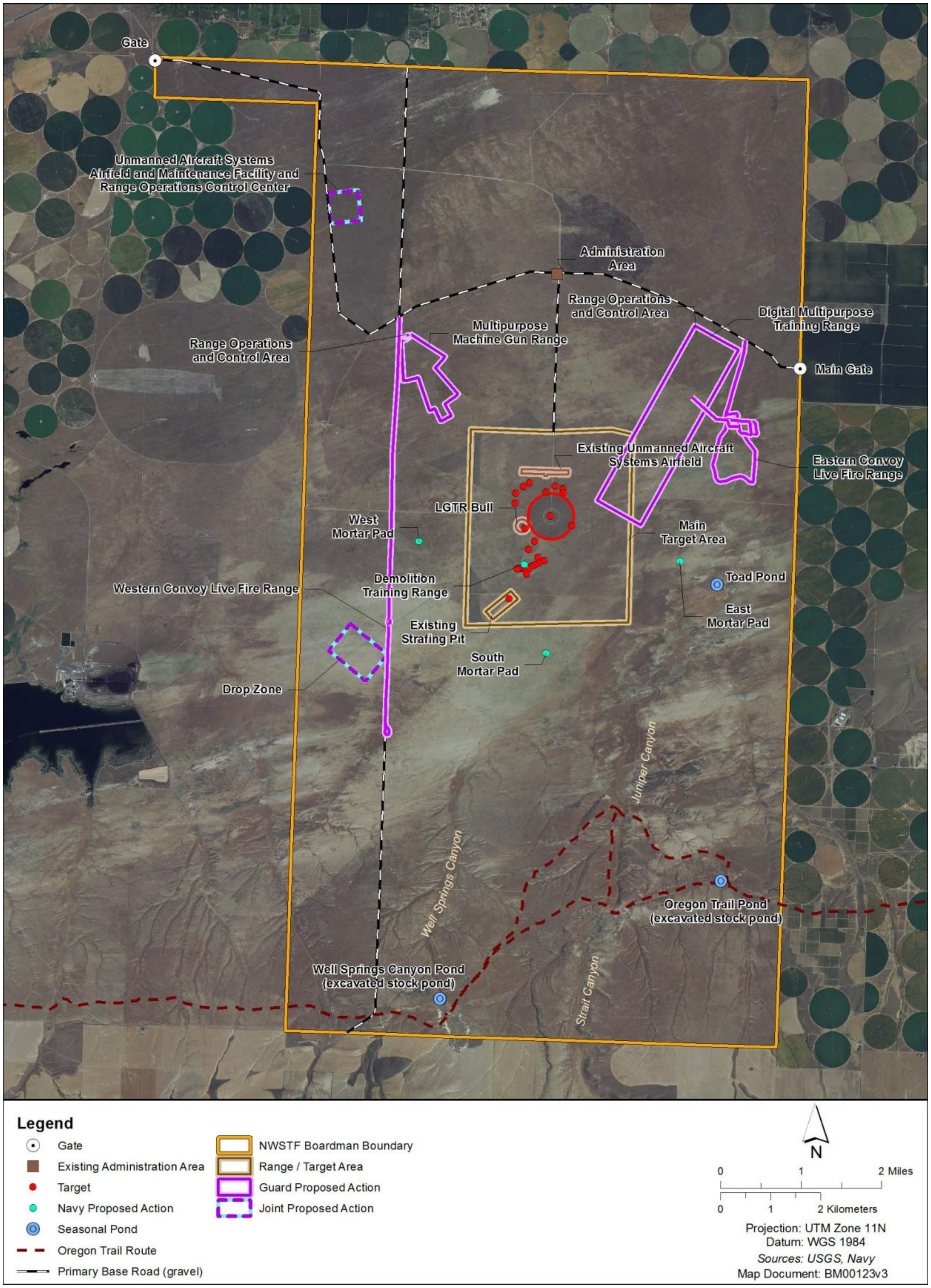


Figure 3.3-1: Water Resources at NWSTF Boardman

One existing groundwater well located on NWSTF Boardman serves the Administration Area with non-potable water (Figure 3.3-1). Several other wells and a water distribution system are located on NWSTF Boardman, but the system has not been regularly functioning since the grazing program ceased in 2002. Bottled water is the only potable water source at NWSTF Boardman. Use of the well in the Administration Area for drinking water was discontinued in the mid-1990s because of high nitrate concentrations. The city of Boardman uses Columbia River water as its drinking water source, rather than groundwater. Some private residences near NWSTF Boardman may use wells for drinking water (U.S. Department of the Navy 2011b).

The Oregon Department of Environmental Quality established the 350,000 ac. (141,640 ha) Lower Umatilla Basin Groundwater Management Area in 1990 because nitrate-nitrogen concentrations exceeded the federal safe drinking water limit of 10 milligrams per liter in many area groundwater samples. This management area includes northern portions of NWSTF Boardman (approximately 25,000 ac. [10,117 ha]). Irrigated agriculture, food processing water, animal feedlots and dairies, domestic septic systems in high densities, and lagoons at U.S. Army Umatilla Chemical Depot were identified as sources of nitrate in groundwater (Oregon Department of Environmental Quality 1997, 2011).

Regional sampling conducted by the Oregon Department of Environmental Quality and the U.S. EPA also indicates a potential for perchlorate contamination throughout the Lower Umatilla Basin Groundwater Management Area. Perchlorate is both a naturally occurring and man-made chemical that is used to produce rocket fuel, fireworks, flares, and explosives. Perchlorate can also be present in bleach and in some fertilizers (U.S. Environmental Protection Agency 2011). In February 2011, the U.S. EPA announced its decision to regulate perchlorate in drinking water. The U.S. EPA has not issued regulations as of April 2015 (projected date for notice of proposed rulemaking is February 2016), but it has provided an Interim Drinking Water Health Advisory level of 15 micrograms per liter (µg/L) based on recommendations of the National Research Council of the National Academies (U.S. Environmental Protection Agency 2008). Following is a summary of groundwater perchlorate data based on information presented in the Range Condition Assessment (RCA) for NWSTF Boardman (U.S. Department of the Navy 2011b):

- In September 2003, the Oregon Department of Environmental Quality performed a round of sampling at 133 wells in the Lower Umatilla Basin Groundwater Management Area. Perchlorate was detected in just over half of the wells and, of the detections, half exhibited values between 1.6 and 4.9 µg/L.
- Eighteen of 25 groundwater samples collected in 2004 from the former Boardman Air Force Range immediately west of NWSTF Boardman and Port of Morrow property north of NWSTF Boardman exhibited detections of perchlorate ranging from 0.46 to 20.7 µg/L.

The types of non-explosive practice munitions used by the Navy at NWSTF Boardman, now and in the recent past, do not contain perchlorate. In addition, research conducted for the 2004 NWSTF Boardman RCA (U.S. Department of the Navy 2004) provided no evidence of historical use of any perchlorate-based munitions at NWSTF Boardman. Soil and groundwater sampling and analysis also indicate that a source of perchlorate does not exist at NWSTF Boardman.

A Comprehensive Range Evaluation field investigation conducted at NWSTF Boardman in 2005 included analysis of groundwater collected from seven monitoring wells (U.S. Department of the Navy 2006a). Perchlorate was detected at 3.0 and 3.7 µg/L in samples from two of the monitoring wells. The well with the higher concentration is considered an upgradient well for the range considering its proximity to the range boundary, its geographic isolation from potential on-site source areas, and the general regional groundwater flow tendencies. Perchlorate was not detected in the remaining wells, which were located near potential source areas or down gradient of potential source areas. Perchlorate was not detected in any soil samples collected from potential sources areas (U.S. Department of the Navy 2006a).

In 2010, a RCA Five-Year Review and Comprehensive Range Evaluation (U.S. Department of the Navy 2011a, b) were completed for NWSTF Boardman and included sampling at nine monitoring wells. Perchlorate was detected in seven of nine monitoring wells, at concentrations ranging from 0.68 to 4.4 µg/L. Surface soils were also collected from four potential source locations, but perchlorate was not detected in any of the samples. The RCA Five-Year Review concluded that a source of perchlorate does not exist at NWSTF Boardman for the following reasons:

- There is no evidence of historical use of any perchlorate-based munitions at NWSTF Boardman.
- The maximum concentration of perchlorate in groundwater at NWSTF Boardman is lower than maximum concentrations in samples from other areas.
- Perchlorate was not detected in surface soil samples collected from potential source locations.

Explosive compounds were detected at low concentrations in samples from one of nine monitoring wells at NWSTF Boardman in 2010. Nitroglycerin was detected at a concentration of 0.690 µg/L and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine High Melting Explosive (HMX) was detected at a concentration of 0.059 µg/L. Concentrations of each compound were well below U.S. EPA Regional Screening Levels of 3.7 µg/L for nitroglycerin and 1,800 µg/L for octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) (U.S. Department of the Navy 2011a). The RCA Five-Year Review indicated that there is neither evidence for, nor a significant threat of an off-range release of constituents that poses a potential risk to human health and the environment (U.S. Department of the Navy 2011b).

3.3.2.3 Current Requirements and Management Practices

The following is a summary of current requirements and practices applicable to water resources at NWSTF Boardman:

- Incidental spills that could contaminate groundwater are avoided and minimized through the *Hazardous Control and Management Plan*. Navy personnel at NWSTF Boardman receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials.
- Potential groundwater contamination issues are addressed in the RCA (U.S. Department of the Navy 2004) and subsequent 5-year reviews (U.S. Department of the Navy 2011b), in accordance with the *Range Sustainability Environmental Program Assessment Policy Implementation Manual* (U.S. Department of the Navy 2006b) (see Section 3.1.1.2.3, Range Sustainability Environmental Program Assessment) for general description of RCA).
- Incidental spills from Oregon National Guard (ORNG) activities are addressed in Oregon Army National Guard Regulation 420-47, Hazardous Material, Waste, and Spill Management Plan.
- An *Operational Range Clearance Plan* (U.S. Department of the Navy 2014) is implemented at NWSTF Boardman in compliance with Department of Defense Directive 4715.11 *Environmental and Explosives Safety Management*. The *Operational Range Clearance Plan* includes provisions for safe management and removal of unexploded ordnance, and recycling of training munitions, munitions debris, and range scrap that has been rendered safe. It includes quality assurance and surveillance procedures (see Section 3.1.1.2.4, Operational Range Clearance, for general description of operational range clearance).

3.3.3 ENVIRONMENTAL CONSEQUENCES

3.3.3.1 No Action Alternative

3.3.3.1.1 Potential Groundwater Contamination

Incidental Spills

The potential for incidental spills to affect groundwater at NWSTF Boardman under the No Action Alternative is low because only small quantities of materials are present and current requirements and practices minimize the risk of a spill occurring. Small quantities of hazardous materials, including petroleum, oils, lubricants, compressed gases, and office supplies (e.g., toner and cleaning supplies) are used in the Administrative Area. A 1,000-gallon (gal.) (3,785.4 L) aboveground storage tank with built in secondary containment is located in the Administrative Area. It contains diesel for fueling vehicles. The Navy has a *Hazardous Control and Management Plan*, Authorized Use List, and Hazard Communication Program for NWSTF Boardman. Navy personnel receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials (U.S. Department of the Navy 2011b).

The small amount of hazardous waste generated at NWSTF Boardman comes from routine activities (building, vehicle, and equipment maintenance), rather than directly from training activities. Typically, hazardous waste is generated only when a specific project, such as painting, is conducted. NWSTF Boardman maintains a Conditionally Exempt Small Quantity Generator status, and is not required to have a U.S. EPA Generator Identification number. Hazardous wastes are disposed of through local vendors (e.g., Safety Kleen provides a parts-cleaning service for vehicle maintenance) (U.S. Department of the Navy 2011b).

The effects of incidental spills on groundwater under the No Action Alternative would be negligible based on the small quantities of materials and wastes used and generated at NWSTF Boardman. There is little chance for a spill to reach groundwater if one were to occur based on the response procedures in place and the small quantities of materials and wastes used and generated at NWSTF Boardman. Incidental spills would have no significant impact on water quality under the No Action Alternative.

Non-Explosive Practice Munitions

As summarized in Tables 2-2 and 2-3, various types of non-explosive practice munitions would be expended in the Main Target Area under the No Action Alternative, including non-explosive practice bombs and small- and medium-caliber rounds. Practice bombs mimic the size, weight, and ballistics of an explosive bomb and consist of a steel or iron bomb body; some are cement-filled. A signal cartridge or spotting charge may be used with most non-explosive practice bombs, based on training needs. The signal cartridge or spotting charge produce a flash of light and puff of smoke upon impact that permits visual evaluation of accuracy. Signal cartridges are used with the smaller practice bombs (MK-76). The main constituents are either 0.4 ounce (oz.) (11.3 grams [g]) of red phosphorus or 0.7 oz. (19.8 g) of titanium tetrachloride, depending on which model cartridge is used. Spotting charges are used with the larger cement-filled bombs (MK-82, MK-83, and MK-84). The main constituent of the spotting charge is 1.5 oz. (42.5 g) of titanium tetrachloride. Most of the constituents of the signal cartridge or spotting charge are consumed upon its activation. Small- and medium-caliber rounds primarily consist of steel or a lead core with a copper jacket.

Non-explosive practice bombs and associated scrap, such as aluminum fin assemblies, would be removed at regular intervals in accordance with the *Operational Range Clearance Plan* (see Section 3.3.2.3, Current Requirements and Management Practices). Spent small- and medium-caliber rounds would not be removed at regular intervals and would accumulate in soils. These rounds primarily consist of steel or a lead core with a copper jacket. The fate and transport of metals from bullets and bullet fragments accumulating in soil is a potential concern for groundwater, with lead being the primary constituent of concern because of its toxicity and its ability to persist in the environment (U.S. Army Environmental Center 1998). Factors affecting the fate and transport of lead on firing ranges are described in the analysis for soils (see Section 3.1.3.1.2, Potential Soil Contamination). Several factors indicate that there is limited risk of lead migrating to groundwater at NWSTF Boardman:

- Lead would be relatively immobile in soils at NWSTF Boardman based on neutral to slightly alkaline soils (pH 7.3–7.9), limited annual precipitation (9–11 inches [in.] per year [23–28 centimeters {cm}]), and the flat terrain. Elevated concentrations would likely be limited to surface soils in the immediate area of projectile impact (see Section 3.1.3.1.2, Potential Soil Contamination). Lead precipitates out of solution and binds to the soil within the pH range of the soils on the proposed ranges (pH 7.3–7.9).
- Depth to groundwater is deep (94–180 ft.) based on data from monitoring wells located near the proposed range locations (U.S. Department of the Navy 2011a).
- While metals are not expected to reach groundwater, mobility would also be limited there based on the median pH value of 7.3 (pH range 6.4–7.9) obtained for nine monitoring wells sampled in 2010 (U.S. Department of the Navy 2011a).

Non-explosive practice munitions would have negligible effects on groundwater under the No Action Alternative because potential contaminants are not expected to migrate to groundwater. The potential for groundwater contamination at NWSTF would continue to be evaluated through the Range Sustainability Environmental Program Assessment process and during 5-year RCA updates. Continued implementation of the *Operational Range Clearance Plan* would also avoid potential impacts on groundwater. Non-explosive practice munitions would have no significant impact on water quality under the No Action Alternative.

Domestic Wastewater Treatment and Disposal

Domestic wastewater would continue to be treated by a septic system serving the Administrative Area. Based on the limited full time presence at NWSTF Boardman (approximately six personnel), loadings to the system would be low and the effects to groundwater under the No Action Alternative would be negligible. Domestic wastewater would have no significant impact on water quality under the No Action Alternative.

3.3.3.1.2 Groundwater Withdrawal

While current groundwater usage data are not available for NWSTF Boardman, use is limited based on the limited number of full time personnel (approximately six personnel) and the limited needs to support training. The effects of groundwater withdrawal would be negligible under the No Action Alternative. Groundwater withdrawal would have no significant impact on water resources under the No Action Alternative.

3.3.3.2 Alternative 1

3.3.3.2.1 Potential Groundwater Contamination

Incidental Spills

The potential for incidental spills to occur would increase under Alternative 1, primarily from refueling activities during construction and during certain ORNG training activities. Refueling of military equipment would be limited to tracked vehicles (e.g., Abrams Tanks and Bradley Fighting Vehicles), which would be used at NWSTF Boardman about 10 weekends per year. Wheeled military vehicles (e.g., humvees and trucks) would not refuel at NWSTF Boardman. All refueling of tracked vehicles would be conducted in designated secondary containment areas. Portable containment would be set up in staging areas during construction and in gravel equipment parking areas near the proposed Digital Multipurpose Training Range (DMPTR) during training. All refueling would be required to comply with Oregon Army National Guard Regulation 420-47, *Hazardous Material, Waste, and Spill Management Plan* as well as any other applicable state and federal regulations. Some hazardous materials in the form of lubricants and antifreeze would be used to perform maintenance on construction equipment during construction and on military vehicles during operations. Drip pads would be placed under all military vehicles and construction equipment when parked. The Navy and ORNG would prepare and implement a Spill Prevention, Control, and Countermeasures Plan if quantities of fuel and other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored at NWSTF Boardman or a Heavy Expanded Mobility Tactical Truck (i.e., Heavy Expanded Mobility Tactical Truck [HEMTT] or fuel tanker truck) were parked on NWSTF Boardman. Any spills would be managed and cleaned up in accordance with Oregon Army National Guard Regulation 420-47; a Spill Prevention, Control, and Countermeasures Plan, if deemed necessary; Army Regulation 200-1 *Environmental Protection and Enhancement*; and applicable state and federal regulatory requirements. If the ORNG is unable to contain a spill or the spill exceeded 42 gal. (158.9 L) of regulated material, the event would be immediately reported to the Oregon Emergency Response System.

The effects on groundwater would be negligible under Alternative 1 because refueling during both construction and training activities would take place in a secondary containment area, drip pads would be placed under equipment when parked, a spill response plan would be in place, and compliance with applicable ORNG, state, and federal regulations would be required. Rapid response would ensure that contaminants would not reach groundwater. Incidental spills would have no significant impact on water quality under Alternative 1.

Non-Explosive Practice Munitions

As summarized in Tables 2-2 and 2-3, non-explosive practice munitions use would increase under Alternative 1. Activities in the Main Target Area would be similar to the No Action Alternative with an increase in small- and medium-caliber rounds.

Estimated annual projectile deposition on the training ranges is summarized in Table 3.3-1. While most of the fired projectiles are expected to hit the ground in the vicinity of targets, projectiles may also be spread elsewhere within the respective Surface Danger Zone. All Surface Danger Zones and Weapons Danger Zones are contained within the NWSTF Boardman boundary.

As discussed for the No Action Alternative, lead is not expected to migrate to groundwater, despite the increase in rounds under Alternative 1, because it would be relatively immobile in soils at NWSTF Boardman based on neutral to slightly alkaline soils (pH 7.3 to 7.9), limited annual precipitation (9 to 11 in. per year [23 to 28 cm]), and the flat terrain. In addition, depth to groundwater is deep (94 to 180 ft.) and groundwater is neutral (median pH value of 7.3).

Table 3.3-1: Estimated Annual Projectile Deposition for All Ranges Combined (Alternatives 1 and 2)

Ammunition	Projectile Composition	Weight Per Round	Alternative 1		Alternative 2	
			Rounds Per Year	Pounds Per Year	Rounds Per Year	Pounds Per Year
5.56 mm rifle	Rifle: copper-jacket with lead core Machine gun: ball-copper-jacket with lead core or tracer-copper jacket, lead slug, igniter and tracer compounds	0.13 oz.	469,500	3,815	269,500	2,190
7.62 mm	Rifle: copper-jacket with lead core Machine gun: ball- copper-jacket with lead core or tracer-copper jacket, lead slug, igniter and tracer compounds	0.34 oz.	813,000	17,276	333,000	7,076
0.50 caliber machine gun or rifle	Ball: gilding metal jacket, lead-antimony tip, and tungsten-steel core Saboted light armor penetrator: tungsten projectile and plastic sabot. Tracer: Gilding metal jacket, lead-antimony slug, igniter and tracer compounds	1.7 oz.	252,000	26,775	102,000	10,838
20 mm cannon	M55A2TP practice round: aluminum alloy projectile	3.5 oz.	88,800	19,425	88,800	19,425
25 mm cannon	M793TP-T practice round: steel and iron projectile with tracer M910/M910E1 TPDS-T practice round: steel and aluminum alloy projectile with tracer	6.4 oz. 3.4 oz.	20,000	6,125	0	0
40 mm grenade	M385/M918 practice round: aluminum and copper with flash-bang Target practice: metal-plastic composite with spotting charge	8.6 oz.	58,500	31,444	10,500	5,644
120 mm cannon	Aluminum sabot and steel dart	7 lb.	700	4,900	0	0
Tube-launched, optically tracked, wire-guided missile	Aluminum and steel	5 lb.	35	175	0	0
		Totals =	**1,702,535**	**109,935**	**803,800**	**45,173**

Notes: mm = millimeter, oz. = ounces, lb. = pounds

Once the Multipurpose Machine Gun Range (MPMGR), DMPTR, and eastern Convoy Live Fire Range (CLFR) are operational, ORNG would conduct assessments in accordance with the Army's Operational Range Assessment Program to fulfill requirements identified in Department of Defense (DoD) Directive 4715.11 *Environmental and Explosives Safety Management on Operational Ranges within the United States* and DoD Instruction 4715.14 *Operational Range Assessments*. These assessments would determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual* (U.S. Army Environmental Center 2005). In addition, the Navy would continue to conduct RCA Five-Year Reviews and implement the *Operational Range Clearance Plan*.

Non-explosive practice munitions would have no significant impact on water quality under Alternative 1.

Domestic Wastewater Treatment and Disposal

Alternative 1 would include construction of a below-ground septic system and drain field to serve the Unmanned Aircraft Systems (UAS) Training and Maintenance Facility. Based on the limited full time presence at NWSTF Boardman (the current six personnel plus the additional seven personnel for the UAS Training and Maintenance Facility), loadings to the system would be low. This facility would be located on Quincy loamy fine sand 2 to 12 percent slopes (Figure 3.1-1) (Natural Resources Conservation Service 2011). While a site survey has not yet been conducted to evaluate the suitability of site soils, written descriptions indicate that Quincy loamy fine sand is given a "very limited" rating for septic tank absorption fields based on a filtering capacity rating of 1.00 (greatest negative impact on use). The very limited rating indicates that the soil has one or more features that are unfavorable for the specified use. The limitations cannot generally be overcome without soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected (Natural Resources Conservation Service 2011).

Potential limitations of the site soils would be addressed during project design and permitting. In Morrow County, septic system permits are issued by the Oregon Department of Environmental Quality. The first step is to apply for a site evaluation, which includes evaluation of the site by a septic system specialist. The second step is to apply for a septic system construction permit. The system would be designed and built in accordance with *Oregon Onsite Wastewater Treatment System Rules* (Oregon Administrative Rules Chapter 340, Divisions 071 and 073). The Rules include provisions for use and approval of alternative treatment technologies when site conditions are not suitable for a traditional septic drain field. In addition, the Rules do not allow installation or use of a system that is likely to pollute public waters or create a public health hazard. Therefore, the effects of domestic wastewater treatment and disposal under Alternative 1 would be negligible. Domestic wastewater would have no significant impact on water quality under Alternative 1.

3.3.3.2.2 Groundwater Withdrawal

Alternative 1 would include development of a groundwater well to serve the proposed UAS Training and Maintenance Facility with non-potable water. The presence of Critical Groundwater Areas and Groundwater Limited Areas in the vicinity of NWSTF Boardman indicate that groundwater resources are limited. Negligible effects on groundwater would be expected under Alternative 1 based on limited water needs and withdrawal, and the fact that withdrawals at NWSTF Boardman are currently low. It is likely that groundwater from the proposed well still would not meet National Primary Drinking Water Regulations for nitrate-nitrogen. Therefore, an alternate potable water source would be used. For example, a potable water tank could be installed and water delivered by tank truck. Groundwater withdrawal would have no significant impact on water resources under Alternative 1.

3.3.3.3 Alternative 2

3.3.3.3.1 Potential Groundwater Contamination

Incidental Spills

The potential for incidental spills to occur would increase under Alternative 2 compared to the No Action Alternative, but would decrease relative to Alternative 1. The DMPTR would not be constructed and operated under Alternative 2. Therefore, the need for refueling associated with construction and training on this range would be eliminated. Management practices (MPs) described for Alternative 1 would also be implemented for Alternative 2. The effects on groundwater would be negligible under Alternative 2 because refueling during both construction and training activities would take place in a secondary containment area, drip pads would be placed under equipment when parked, a spill response plan would be in place, and compliance with applicable ORNG, state, and federal regulations would be required. Rapid response would ensure that contaminants would not reach groundwater. Incidental spills would have no significant impact on water quality under Alternative 2.

Non-Explosive Practice Munitions

As summarized in Tables 2-2 and 2-3, non-explosive practice munitions use would increase under Alternative 2 compared to the No Action Alternative, but would decrease relative to Alternative 1 because the DMPTR would not be constructed and operated, and the non-explosive practice rounds associated with the DMPTR would not be expended at NWSTF Boardman. Under Alternative 2, approximately 1,440 M224 60 millimeter non-explosive practice mortar rounds would be fired into the Main Target Area per year and half of the small- and medium-caliber rounds expended on the eastern CLFR would shift to the western CLFR. Expended non-explosive mortar rounds would be retrieved and reused or scrapped. Therefore, non-explosive practice mortar rounds would have no potential to affect groundwater.

As discussed for the No Action Alternative and Alternative 1, lead is not expected to migrate to groundwater, despite the increase in rounds under Alternative 2, because it would be relatively immobile in soils at NWSTF Boardman based on neutral to slightly alkaline soils (pH 7.3 to 7.9), limited annual precipitation (9 to 11 in. per year [23 to 28 cm]), and the flat terrain. In addition, depth to groundwater is deep (94 to 180 ft.) and groundwater is neutral (median pH value of 7.3).

Once the MPMGR and both CLFRs are operational, ORNG would conduct assessments in accordance with the Army's Operational Range Assessment Program to fulfill requirements identified in DoD Directive 4715.11 *Environmental and Explosives Safety Management on Operational Ranges within the United States* and DoD Instruction 4715.14 *Operational Range Assessments*. These assessments would determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual* (U.S. Army Environmental Center 2005). In addition, the Navy would continue to conduct RCA Five-Year Reviews and implement the *Operational Range Clearance Plan*.

Non-explosive practice munitions would have no significant impact on water quality under Alternative 2.

Domestic Wastewater Treatment and Disposal

The volume of domestic wastewater generated at NWSTF Boardman under Alternative 2 would increase slightly compared to the No Action Alternative and Alternative 1. Under Alternative 2, the proposed Joint-Use Administration Building and UAS Training and Maintenance Facility would share a common below-ground septic system and drain field. The system would be designed to accommodate the slight increase in loading. As discussed for Alternative 1, the Quincy loamy fine sand soils in the proposed location have a very limited rating for septic tank absorption fields (Natural Resources Conservation Service 2011). Therefore, alternative treatment technologies might need to be considered during the design and permitting process. As discussed for Alternative 1, the system would be permitted by the Oregon Department of Environmental Quality and would be designed and built in accordance with *Oregon Onsite Wastewater Treatment System Rules* (Oregon Administrative Rules Chapter 340, Divisions 071 and 073). The Rules do not allow installation or use of a system that is likely to pollute public waters or create a public health hazard. Therefore, the effects of domestic wastewater treatment and disposal under Alternative 2 would be negligible. Domestic wastewater would have no significant impact on water quality under Alternative 2.

3.3.3.3.2 Groundwater Withdrawal

Alternative 2 would include development of a groundwater well to serve the proposed Joint-Use Administration Building and UAS Training and Maintenance Facility with non-potable water. The presence of Critical Groundwater Areas and Groundwater Limited Areas in the vicinity of NWSTF Boardman indicate that groundwater resources are limited. Negligible effects to groundwater would be expected under Alternative 2 based on limited water needs and withdrawal, and the fact that withdrawals at NWSTF Boardman are currently low. It is likely that groundwater from the proposed well still would not meet National Primary Drinking Water Regulations for nitrate-nitrogen. Therefore, an alternate potable water source would be used. For example, a potable water tank could be installed and water delivered by tank truck. Groundwater withdrawal would have no significant impact on water resources under Alternative 2.

3.3.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.3.3.4.1 Proposed Management Practices

The current MPs listed in Section 3.3.2.3 (Current Requirements and Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following MPs would be implemented to avoid and minimize potential impacts on water quality under Alternatives 1 and 2:

- Incidental fuel spills would be avoided during construction and training by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- A Spill Prevention, Control, and Countermeasures Plan would be developed if quantities of fuel and other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored at the NWSTF Boardman or a HEMTT or fuel tanker truck were parked on NWSTF Boardman. The Plan would help to ensure rapid and effective response to incidental spills and avoid contaminant migration to groundwater.
- Any spills would be managed and cleaned up in accordance with Oregon Army National Guard Regulation 420-47; a Spill Prevention, Control, and Countermeasures Plan, if deemed necessary; AR 200-1; and applicable Navy, state, and federal regulatory requirements. If the ORNG is

unable to contain a spill or the spill exceeded 42 gal. (158.9 L) of regulated material, the event would be immediately reported to the Oregon Emergency Response System.

- The NWSTF Boardman *Operational Range Clearance Plan* would be updated and implemented to address requirements for the new ranges.
- Under the Navy's Range Sustainability Environmental Program Assessment (RSEPA), RCA 5-year Reviews would continue to be conducted and appropriate steps would be taken to analyze environmental conditions on the range and to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off range areas that could pose risks to human health or the environment. RSEPA focus would be expanded to incorporate new range activities and new training areas under periodic assessments.
- Assessments would be conducted for the DMPTR (Alternative 1 only), MPMGR, and both CLFRs in accordance with the Army's Operational Range Assessment Program. These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual*.

3.3.3.4.2 Proposed Monitoring

No specific monitoring needs where identified for water quality. However, the need for groundwater sampling, analysis, or monitoring would continue to be considered during RCA Five-Year Reviews conducted under the Navy's Range Sustainability Environmental Program Assessment program and during Operational Range Assessments conducted by ORNG.

3.3.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for water quality based on the analysis presented in Section 3.3.3 (Environmental Consequences), implementation of current MPs, and implementation of proposed MPs.

3.3.3.5 Summary of Effects and Conclusions

Table 3.3-2 lists each stressor analyzed for potential impacts on water resources at NWSTF Boardman. None of the alternatives would result in significant impacts on water quality.

Table 3.3-2: Summary of Impacts on Water Quality

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative	
Potential Release of Soil or Water Contaminants	
Incidental Spills	The potential for incidental spills is low based on the small quality of petroleum, oil, and lubricants used in the administrative area.
Non-explosive Practice Munitions	Negligible. Potential contaminants would not migrate to groundwater.
Domestic Wastewater Treatment and Disposal	Negligible. Current septic system loading is low.
Other Stressors	
Groundwater Withdrawal	Negligible. Current groundwater needs are low.
Impact Conclusion	The No Action Alternative would not result in significant impacts on water quality.
Alternative 1	
Potential Release of Soil or Water Contaminants	
Incidental Spills	Negligible. Small fuel spills during refueling and minor equipment leaks may occur, but spill prevention, control, and countermeasures would minimize risk. Rapid response would ensure that contaminants do not reach groundwater.
Non-explosive Practice Munitions	Negligible. Potential contaminants would not migrate to groundwater.
Domestic Wastewater Treatment and Disposal	Negligible. The onsite treatment system would be permitted by the Oregon Department of Environmental Quality and would be designed and built in accordance with Oregon Onsite Wastewater Treatment System Rules (Oregon Administrative Rules Chapter 340, Divisions 071 and 073). The Rules do not allow installation or use of a system that is likely to pollute public waters or create a public health hazard.
Other Stressors	
Groundwater Withdrawal	Negligible based on limited water needs and withdrawal. It is likely that groundwater from the proposed well would not meet National Primary Drinking Water Regulations for nitrate-nitrogen. Therefore, an alternate potable water source would be used (e.g., delivered by tank truck).
Impact Conclusion	Alternative 1 would not result in significant impacts on water quality.

Table 3.3-2: Summary of Impacts on Water Quality (continued)

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
Alternative 2	
Potential Release of Soil or Water Contaminants	
Incidental Spills	Negligible. Small fuel spills during refueling and minor equipment leaks may occur, but spill prevention, control, and countermeasures would minimize risk. Rapid response would ensure that contaminants do not reach groundwater. Risk of spills would be lower than Alternative 1.
Non-explosive Practice Munitions	Negligible. Potential contaminants would not migrate to groundwater. Fewer projectiles would be expended compared to Alternative 1.
Domestic Wastewater Treatment and Disposal	Negligible. The onsite treatment system would be permitted by the Oregon Department of Environmental Quality and would be designed and built in accordance with Oregon Onsite Wastewater Treatment System Rules (Oregon Administrative Rules Chapter 340, Divisions 071 and 073). The Rules do not allow installation or use of a system that is likely to pollute public waters or create a public health hazard.
Other Stressors	
Groundwater Withdrawal	Negligible based on limited water needs and withdrawal. It is likely that groundwater from the proposed well would not meet National Primary Drinking Water Regulations for nitrate-nitrogen. Therefore, an alternate potable water source would be used (e.g., delivered by tank truck).
Impact Conclusion	Alternative 2 would not result in significant impacts on water quality.

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3.4 NOISE

3.4.1 INTRODUCTION

This section addresses potential noise impacts on the human terrestrial environment in the vicinity of Naval Weapons Systems Training Facility (NWSTF) Boardman from noise generated by activities identified in the alternatives, including the Proposed Action. Potential impacts of noise on terrestrial biological resources are addressed in Section 3.6 (Wildlife) as well as on public neighbors and sensitive receptors[1] in Section 3.12 (Public Health and Safety and Protection of Children).

3.4.1.1 Sound Characteristics

Sound results from vibrations, introduced into a medium such as air, that stimulate the auditory nerves of a receptor to produce the sensation of hearing. Sound is undesirable if it interferes with communication, is intense enough to damage hearing, or disrupts normal human activities. Undesirable sound is commonly referred to as "noise." Human responses to sound vary with the types and characteristics of the sound source, the distance between the source and receptor, receptor sensitivity, the background sound level, and other factors such as time of day. Sound may be intermittent or continuous, steady or impulsive, and may be generated by stationary sources such as industrial plants or transient noise sources such as cars and aircraft. While aircraft are not the only sources of noise in an urban, suburban, or even rural environment, they are readily identified by their output and are given special attention in this Environmental Impact Statement (EIS).

Sound energy travels in waves. Its intensity at a receptor varies as a function of source intensity, the characteristics of the sound wave, the distance between source and receiver, and environmental conditions. Reflection, refraction, diffraction, and absorption are physical interactions between sound waves and surfaces or the medium through which the sound travels.

Urban environments include near-constant, long-term sound sources which create a background sound level, and intermittent, intrusive sources which create noise peaks that are noticeably higher than the background levels. The extent to which an intrusive noise affects a given receptor in the environment depends upon the degree to which the intruding noise exceeds the background sound level. Both background and intrusive noise may affect the quality of life in a given environment. Cumulative, long-term exposure to excessive background noise is recognized as the primary cause of hearing loss. Intrusive noise, although not a cause of permanent hearing loss, can contribute to stress, irritability, loss of sleep, and impaired work efficiency.

Impulsive sound is short in duration—less than 1 second—and high in intensity. Impulsive sound has an abrupt onset and decays rapidly; it is characteristic of small arms fire and sonic booms, and is expressed in peak, unweighted decibels (dBP). Although impulsive sound is short in duration, it may be a source of discomfort for many people as the rapid onset of noise may produce a "startle" effect (United States [U.S.] Department of the Navy 1978).

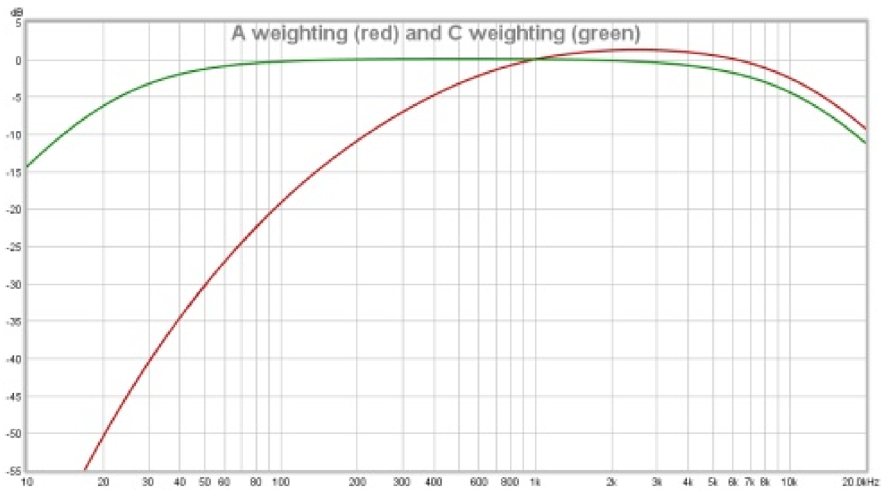
3.4.1.2 Sound Spectrum

Sound oscillates in waves, and the rates of oscillation (frequencies) are measured in cycles per second, or Hertz (Hz). The human ear can detect sounds ranging in frequency from about 20 to 20,000 Hz, with

[1] Noise-sensitive areas are those areas where noise interferes with normal activities associated with the area's use. Normally, noise-sensitive areas and sensitive receptors include residential, educational, health, religious structures and sites, parks, recreational areas (including areas with wilderness characteristics), wildlife refuges, and cultural and historical sites.

the ear most sensitive to frequencies from 1,000 to 4,000 Hz (U.S. Army 2005). Most environmental sounds consist not of a single frequency, but rather a broad band of frequencies that vary in intensity. Sound frequencies from military training activities vary greatly. Some examples of frequencies at peak sound energy include fixed-wing aircraft (2,000–4,000 Hz), small arms (approximately 500 Hz), explosives (approximately 31 Hz), street vehicles (approximately 60 Hz), and diesel trucks (approximately 250 Hz) (U.S. Department of the Navy 1978; U.S. Army 2005).

The human ear is not equally sensitive to all sound frequencies within the frequency range of human hearing; the human ear cannot detect lower frequencies as well as it can detect higher frequencies. Thus, the "raw" sound intensity measured by mechanical devices is selectively weighted—or filtered—to simulate the non-linear response of the human ear. The two accepted weighting networks are the C scale and the A scale (Figure 3.4-1).



Source: U.S. Army 2005

Figure 3.4-1: A and C Weighting Scales

Weighting networks are used in sound meters to adjust their frequency response to "raw" (unweighted) measured sounds. The A-weighting network is designed to duplicate the sensitivity of the human ear, and heavily discounts sound energy at low frequencies and at very high frequencies. In several studies, a person's judgment of the loudness of a sound has been shown to correlate well with the A-weighted values of those sounds (OPNAVINST 3550.1). For this reason, the A scale is the most common weighting scheme for noise measurements and standards and is used for most environmental noise evaluations. These adjusted sound levels are termed "A-weighted" sound levels, denoted as dB(A) or simply dBA. The A-weighted scale is used internationally in sound standards and regulations. Therefore, dBA is the primary sound metric to be used in analyzing sound effects under environmental consequences because its characteristics are reflective of the human ear's frequency response.

The C-weighting network weights sound energy levels equally across the frequency range of human hearing, while discounting some of the very high and very low frequencies at each end of the range. Accordingly, the C scale closely resembles the actual sound pressure level received by sound level meters, and is often used to calibrate sound meters. C-weighted sound levels also are often used for the analysis of low-frequency sounds such as artillery and detonations. Sound measurements thus adjusted are termed "C-weighted" sound levels, denoted as dB(C) or simply dBC.

Impulsive sound is measured and expressed in dBP. Peak impulsive sound weighting is used for single-event sound, or impulsive sound events that last less than 1 second in duration, such as gun noise. Peak sound (dBP) does not correlate directly with time-averaged sound standards. The peak sound values presented in this analysis are PK-15, or the calculated peak sound level expected to be exceeded 15 percent of the time. PK-15 accounts for statistical variation in the peak sound level due to weather conditions (U.S. Army 2005). The PK-15 sound value is conservative and is considered to represent meteorological conditions that favor atmospheric transmission of sound.

3.4.1.3 Sound Metrics

Transient sound is defined as an "event having a beginning and an end where the sound temporarily rises above the background and then fades into it" (U.S. Army 2005). These types of sounds, measured in terms of Sound Exposure Level (SEL), are associated with vehicles driving by, aircraft overflights, or impulse noise. The SEL is based on two characteristics of transient sound, duration and intensity, where a long duration, low intensity event can be as annoying as a high intensity, shorter event. The SEL is the total acoustic energy in an event normalized to 1 second (U.S. Army 2005). This number represents all of the acoustic energy for the event in a 1-second period.

A continually varying sound level over a given period can be described as a single "equivalent" sound level (L_{eq}) that contains an amount of sound energy equal to that of the actual sound level. As shown in the top panel of Figure 3.4-2, the sound level varies over time and increases during a sound "event" (in this case, an aircraft overflight). Thus, the L_{eq} is a measure of the average acoustic energy over a stated period, which includes both quiet periods and sound events. Equivalent sound levels can represent any length of time, but typically are associated with some meaningful period, such as an 8-hour L_{eq} for an office, or a 1-hour L_{eq} for a classroom lecture (U.S. Army 2005). The L_{eq} is averaged over a 1-, 8-, or 24-hour period. The L_{eq} is used to describe continuous sound sources, and may be obtained by averaging sound levels over a selected period. This level is the estimation of the continuous sound level that would be equivalent to the fluctuating sound signal under consideration (OPNAVINST 3550.1). A L_{eq} that is a 24-hour average can also be termed the Day-Night Average Sound Level (Ldn or DNL), with a caveat. The DNL is the average noise level over a 24-hour period (as shown in the bottom panel of Figure 3.4-2; this represents the average of twenty-four 1-hour L_{eq} values). However, the noise between the hours of 10 p.m. and 7 a.m. is artificially increased by 10 decibels (dB). This noise is weighted to take into account the decrease in background noise of 10 dB during this period (Figure 3.4-2).

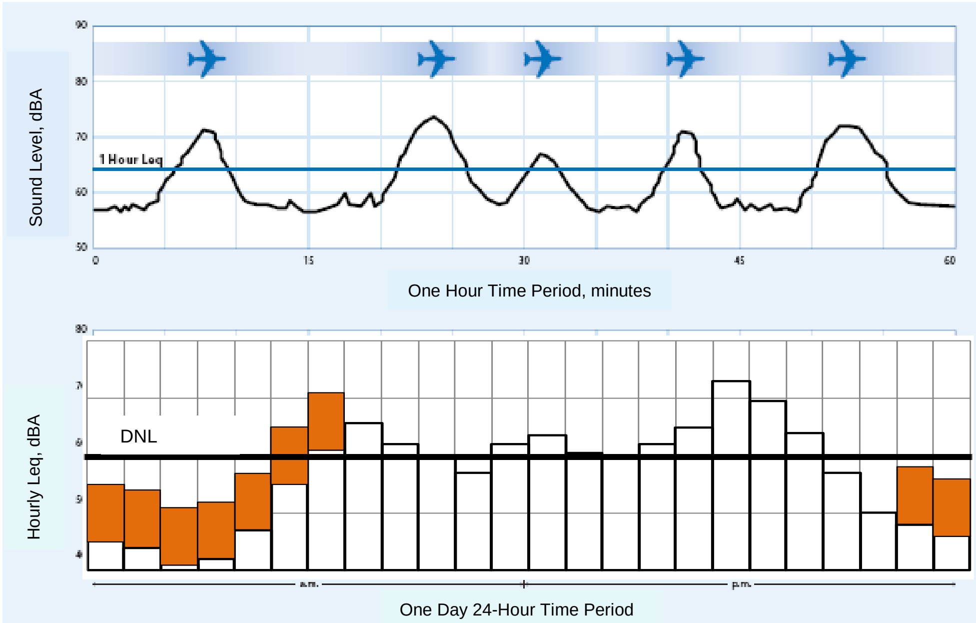


Figure 3.4-2: Relationship of Sound Level, L_{eq}, and DNL

3.4.1.4 Sound Intensity and Perception

Sound intensity is expressed in dB, a logarithmic scale that compares the power of an acoustical signal to a reference power level. A sound level of zero decibels is defined as the threshold of human hearing. The quietest environmental conditions yield sound levels of about 20 dBA. Typical night-time sound levels in quiet residential areas have a sound level of about 35–45 dBA. Normal speech has a sound level of about 60 dBA at a distance of about 3.3 feet (ft.) (1 meter [m]). A freight train passing by at about 49.2 ft. (15 m) yields a sound level of about 85 dBA. The human pain threshold is about 120 dBA (Figure 3.4-3).

A 1 dB change in the sound level is not perceptible to humans (imperceptible change), a 3 dB change is barely perceptible, and a 5 dB change is clearly noticeable. A change in sound level of 10 dB represents more than a three-fold change in sound intensity. However, a 10 dB change is perceived by the human ear as a doubling or halving in loudness.

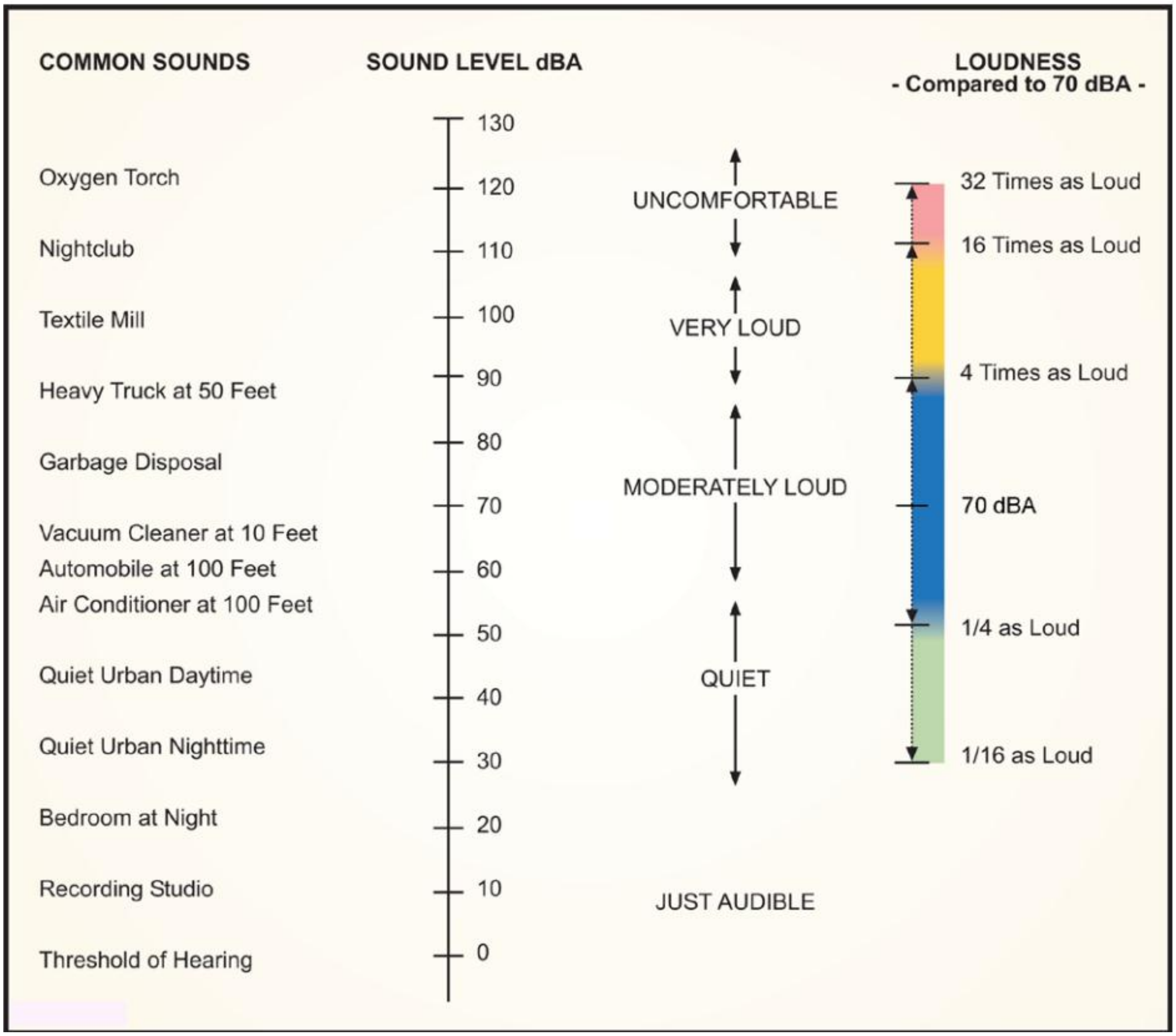


Figure 3.4-3: A-Weighted Sound Levels from Typical Sources

3.4.1.5 Sound Propagation

Sound energy radiates outward from its source. This sound energy attenuates (decreases in intensity) as it moves away from its source because of geometric spreading of the sound energy, atmospheric absorption, ground attenuation, and shielding. Sound metrics for discrete sources are expressed in terms of a distance from the source (a typical reference distance is 50 ft. [15.2 m]).

Sound waves from point sources radiate in a spherical pattern, with the wave intensity attenuating due to geometric spreading by 6 dB per doubling of distance from the source (U.S. Army 2005). Line sources such as roads generate composite sound waves from numerous moving point sources that radiate outward in parallel planes; these waves attenuate due to geometric spreading by only 3 dB per doubling of distance.

At substantial distances from the source, air absorption and ground attenuation can affect sound propagation. The efficiency of atmospheric absorption varies over the range of sound frequencies. At frequencies around 2,000 Hz, air absorption is about 20 dB per kilometer (km). At 1,000 Hz, it is about

7 dB per km. At frequencies below 125 Hz, it is less than 1 dB per km. Factors for ground attenuation and barrier attenuation likewise vary by frequency. In practice, empirical determinations of sound attenuation (i.e., measuring the actual source in its proposed location) are best able to account for all possible factors.

3.4.1.6 Sound Guidance Documents

- The DoD's Range Air Installations Compatible Use Zone (RAICUZ) Program (Chief of Naval Operations Instruction [OPNAVINST] 3550.1) provides compatibility criteria for various land uses. Army Regulation 200-1 (Environmental Protection and Enhancement) presents analogous criteria. Compatible land use means the use of land that is identified as normally compatible with the outdoor sound environment (or an adequately attenuated sound level reduction for any indoor activities involved) at the location because the yearly day-night average sound level is at or below those identified for that land use. Separate evaluation criteria apply to impulsive sound events, which are based on information from the U.S. Army Public Health Command's (formerly Center for Health Promotion and Preventive Medicine) Operational Noise Manual: An Orientation for Department of Defense Facilities (U.S. Army 2005). The Department of Defense Noise Working Group (Department of Defense 2013) addresses noise complaint risks for impulsive noise.
- 49 United States Code (U.S.C.) 40101 et seq., as amended by Public Law (PL) 103–305 (August 23, 1994) (The Federal Aviation Act of 1958). This act is the basic aviation policy and has been amended often since 1958. In its original provisions the Act gave the Federal Aviation Administration (FAA) responsibility for all aspects of aviation but did not specifically authorize the FAA to establish noise abatement rules.
- 49 U.S.C. 44715 (Controlling Aircraft Noise and Sonic Boom, 1968). Authorized the FAA to prescribe standards for the measurement of aircraft noise and to establish regulations to abate noise.
- 42 U.S.C. 4901 (The Noise Control Act of 1972, as amended). This act amended the Federal Aviation Act and the Aircraft Noise Abatement Act to involve the U.S. Environmental Protection Agency in the regulation of airport noise.
- 49 U.S.C. 47501–47510 (Aviation Safety and Noise Abatement Act of 1979, as amended). Title I of this Act gives the FAA authority to issue regulations on "air noise compatibility planning" and to make funds available for airport projects contained in an approved noise compatibility program. The Act also required the Secretary of Transportation to establish federal standards for measuring and assessing noise impacts on residences near airports.
- Federal Aviation Administration (FAA) Order 1050.1 "Environmental Impacts: Policies and Procedures" Appendix B, Federal Aviation Administration Requirements for Assessing Impacts Related to Noise and Noise-Compatible Land Use and Section 4(f) of the Department of Transportation Act.

3.4.1.6.1 Time-Averaged Sound Levels

Sound standards for land use compatibility established by DoD and civilian jurisdictions are expressed in terms of the DNL. Based on numerous sociological surveys and recommendations of federal interagency councils, the most common benchmark for assessing environmental noise impacts is a DNL of 65 dBA (Schomer 2005, Federal Interagency Committee On Noise 1992). Sound levels up to 65 dBA, DNL are considered to be compatible with land uses such as residences, transient lodging, and medical facilities. Appropriate sound mitigation is recommended for new development in areas where the DNL exceeds 65 dBA.

Small Arms and Aviation Land Use Zones

OPNAVINST 3550.1 and Federal Regulation Part 150 provides compatibility criteria for various land uses (Table 3.4-1). Compatible land use means the use of land that is identified as normally compatible with the outdoor noise environment (or an adequately attenuated noise level reduction for any indoor activities involved) at the location because the yearly day-night average sound level is at or below those identified for that or similar land use. These land use planning zones are utilized by the Navy for small arms noise as well.

- Noise Zone I includes all areas in which the A-weighted DNL (ADNL) from small arms or aviation activities is less than 65 dBA. Noise Zone I is the zone farthest from the sound source, and includes all areas not within the other two Noise Zones. This area is suitable for all types of land uses. Additionally, Federal Regulation Part 150 also indicates that all land use categories are compatible with these noise levels (14 Code of Federal Regulations [C.F.R.] Part 150, Table 1).
- Noise Zone II includes all areas in which the ADNL is between 65 and 75 dBA. Exposure in this zone is substantial, and allowable land uses include manufacturing, warehousing, and transportation. Residential development in this zone is not normally recommended. The land use categories defined by Federal Regulation Part 150 as not being compatible with these noise levels include residences, mobile home parks, transient lodging, schools, and hospitals and churches (14 C.F.R. Part 150, Table 1).
- Noise Zone III includes all areas in which the ADNL is above 75 dBA. Noise-sensitive land uses, such as housing, schools, churches and medical facilities, are not compatible with this zone (14 C.F.R. Part 150, Table 1).

Table 3.4-1: Noise Zones and Compatibility Levels for Small Arms and Aviation A-Weighted Day-Night Levels

Zone	Small Arms/Aviation A-weighted DNL	Compatibility with Residential/Noise-Sensitive Land Uses
I	< 65 dBA	Compatible (Okay for all land uses)
II	65–75 dBA	Normally Incompatible (Not okay for sensitive receptors)[1]
III	> 75 dBA	Incompatible (Not okay for sensitive receptors or some other land uses)

[1] Sensitive receptors include residences, mobile home parks, transient lodging, schools, hospitals and churches

Notes: DNL = Day-Night Sound Level; dBA = decibels, A-weighted
Source: OPNAVINST 3550.1, AR 200-1, 14 C.F.R. Part 150, Table 1

Small Arms Peak Sound Level Land Use Zones

The dBP does not correlate directly with time-averaged sound standards that are described in the section above. The land use zones above are defined for continuous noise generated by the use of small arms and aviation activities rather than single-event noise, or impulsive noise events that last 1 second in duration. For single-event noise, or impulsive noise events that last less than 1 second in duration (e.g., gun noise), dBP is used. The peak sound values presented in this analysis are PK-15, or the calculated peak sound level expected to be exceeded 15 percent of the time. PK-15 accounts for statistical variation in the peak sound level due to weather conditions (AR 200-1). The PK-15 sound value is conservative and is considered to represent meteorological conditions that favor atmospheric transmission of sound. Army Regulation 200-1 defines the following three land use planning zones (Table 3.4-2) to classify the compatibility of small arms with residential or noise-sensitive areas:

- Noise Zone I includes all areas in which the PK-15 is less than 87 dB. Noise Zone I is the zone farthest from the sound source, and includes all areas not within the other two Noise Zones. This area is suitable for all types of land uses.
- Noise Zone II includes all areas in which the PK-15 is between 87 and 104 dB. Sound exposure in this zone is substantial, and allowable land uses include manufacturing, warehousing, and transportation. Residential development in this zone is not normally recommended.
- Noise Zone III includes all areas in which the PK-15 is above 104 dB. Sound-sensitive land uses, such as housing, schools, churches and medical facilities, are not recommended within this zone.

Table 3.4-2: Noise Zones and Compatibility Levels for Small Arms Unweighted Peak Noise Levels (PK-15)

Zone	Small Arms PK-15 Peak Unweighted	Compatibility with Residential/Noise-Sensitive Land Uses
I	< 87 dB	Compatible (Okay for all land uses)
II	87–104 dB	Normally Incompatible (Not okay for sensitive receptors)
III	> 104 dB	Incompatible (Not okay for sensitive receptors or some other land uses)

Notes: PK-15 = unweighted peak, 15 percent metric; dB = decibels
Source: AR-200

Impulse Noise

To determine the land use compatibility when employing sound sources that are impulsive in nature, less than 1 second in duration, but are not small arms related (e.g., explosive detonations), the C-weighted DNL is used. C-weighted sound levels are often used for the analysis of low-frequency noises such as artillery and detonations. The U.S. Army Public Health Command has defined the following three land use planning zones (Table 3.4-3) for explosive/impulse noise (U.S. Army 2005):

- Noise Zone I includes all areas in which the C-weighted DNL (CDNL) from explosives is below 62 dBC. Noise Zone I is the zone farthest from the noise source and includes all areas not within the other two Noise Zones. This area is suitable for all types of land uses.
- Noise Zone II includes all areas in which the CDNL is between 62 and 70 dBC. Exposure in this zone is substantial, and allowable land uses include manufacturing, warehousing, and transportation. Residential development in this zone is not normally recommended.
- Noise Zone III includes all areas in which the CDNL is above 70 dBC. Noise-sensitive land uses, such as housing, schools, churches and medical facilities, are not recommended within this zone.

Table 3.4-3: Noise Zones and Compatibility Levels for Impulse and Large Arms Day-Night Levels

Zone	Explosives Day-Night Average C-weighted DNL	Compatibility with Residential/Noise-Sensitive Land Uses
I	< 62 dBC	Compatible (Okay for all land uses)
II	62–70 dBC	Normally Incompatible (Not okay for sensitive receptors)
III	> 70 dBC	Incompatible (Not okay for sensitive receptors or some other land uses)

Notes: DNL = Day-Night Sound Level; PK-15 = unweighted peak, 15 percent metric; dBA = decibels, A-weighted; dBC = decibels, C-weighted
Source: AR 200-1

Additionally, community annoyance from impulsive noise can be assessed using CDNL. The relationship between CDNL and annoyance has been estimated, based on community reaction to impulsive noises over several years (Federal Interagency Committee on Noise 1992). Whereas occupational noise levels are assessed in terms of hearing loss, environmental noise levels are assessed in terms of their potential to interfere with personal, workplace, and community activities, and in terms of their potential to annoy occupants of nearby land uses.

The DoD's Noise Working Group indicates that impulse noises should be considered separately when the peak sound level exceeds 110 dB. The effects of impulse noises should be determined based on CDNL (Department of Defense 2013). Table 3.4-4 presents DoD guidelines for evaluating the effects on the community of impulsive gun noise. The DoD developed metrics to evaluate the complaint potential from impulsive noise. This set of metrics, developed by the Naval Surface Warfare Center, Dahlgren, Virginia, are based on over 10 years experience using meteorological forecasts. The guidelines are shown in the table below. These levels resulted from the best compromise between cost, efficiency of range operations, and good community relations. The metrics are presented in Table 3.4-4 and are expressed in dBP rather dBC, and correspond to areas of low to high risk of noise complaints (Department of Defense 2013, AR 200-1). These impulsive noise levels are an additional metric used to assess the extent of impulsive effects on the region.

Table 3.4-4: Impulse and Large Arms Complaint Prediction Guidelines

Predicted Sound Level (dBP)	Risk of Complaints	Action
< 115	LOW	Fire all programs
115–130	MODERATE	Fire important tests Postpone non-critical testing if possible
130–140	HIGH	Only extremely important tests should be fired
> 140	HIGH (risk of physiological and structural damage claims)	Postpone all explosive activities

Notes: (1) dBP = unweighted decibels. (2) For rapid-fire test programs or programs that involve many repetitions of impulse sound, reduce allowed sound levels by 15 dBP. Source: Department of Defense 2013, AR 200-1

Technical literature (e.g., Schomer 2005) suggests that "regular" impulse sounds be given a 5 dBP penalty to properly account for their characteristics, and penalties of 12–15 dBP are suggested for highly energetic impulsive noise. As Table 3.4-4 indicates, the Naval Surface Warfare Center recommends a

15 dBP weighting for rapid-fire impulse noise. Such an adjustment moves a sound source up one risk category.

3.4.1.7 Determination of Significance

Noise contours for aviation activity, small arms noise, and large arms noise were generated for activities performed under the No Action Alternative, Alternative 1 and Alternative 2. The contours for activities performed under Alternative 1 or 2 were compared to the contours for activities performed under the No Action Alternative. Using these contours, the alternatives were examined to determine if they would produce one or more of the following effects:

- A long-term increase in the average hourly sound level at any sensitive receptor of 5 or more decibels, which would indicate a substantial degradation in the noise environment.
- A substantial increase in the number or intensity of intrusive noise events on nearby public or private lands, which would indicate a substantial increase in distraction and interference with noise-sensitive activities.
- Impulse noise that would result in a high risk of noise complaints (see Table 3.4-4).

Additionally, since the FAA may utilize this EIS to fulfill requirements to establish the proposed Military Operations Areas (MOAs), an additional level of analysis was performed to compare DNLs under the Action Alternatives with the DNL under the No Action Alternative. This analysis included:

- The DNLs for the No Action, Alternative 1, and Alternative 2 were calculated. The DNL from the Action Alternative was overlaid on the DNL contour map for the No Action Alternative. By overlaying the maps, a "difference" map was created, which shows areas where the DNL may rise or drop as a result of implementation of the Action Alternatives.
- Noise-sensitive areas experiencing an increase in noise of DNL 1.5 dB or more into or within the DNL 65 dB noise exposure when compared to the No Action Alternative for the same timeframe (aerial maps of the areas were inspected for residences or other sensitive receptors within the 65 and 70 dB contours) were considered a significant change in the noise environment. If DNLs did not increase 1.5 dB or more as a result of implementation of the Action Alternative (or dropped), this was considered a non-significant change in the noise environment.
- If noise-sensitive areas at or above DNL 65 dB showed an increase of DNL 1.5 dB or more, further analysis would be conducted to identify noise-sensitive areas between DNL 60 and 65 dB having an increase of DNL 3 dB or more due to the proposed action aerial maps of the areas that were inspected for residences or other sensitive receptors within the 60 and 65 dB contours.

3.4.2 Affected Environment

3.4.2.1 Sensitive Receptors

Noise-sensitive areas are those areas where noise interferes with normal activities associated with its use. Normally, noise-sensitive areas include residential, educational, health, religious structures and sites, parks, recreational areas (including areas with wilderness characteristics), wildlife refuges, and cultural and historical sites. For example, in the context of noise from airplanes and helicopters, noise-sensitive areas include such locations within the 65 dB DNL noise contour. Individuals and isolated, residential structures may be considered compatible within the 65 dB DNL noise contour where the primary use of land is agricultural and adequate noise attenuation is provided (OPNAVINST 3550.1). Also, transient residential use such as motels may be considered compatible within the 65 dB DNL noise contour where adequate noise attenuation is provided. In the context of facilities and equipment, such as explosives firing ranges, but not including aircraft, noise-sensitive areas may include areas in the immediate vicinity of operations, pursuant to the Noise Control Act of 1972. Users of designated recreational areas (i.e., such as visitors at the Pioneer Cemetery or along the Oregon Trail [Figure 3.4-4]) are considered sensitive receptors.

U.S. Census data showing block groups and population and total housing units are shown in Figure 3.4-5 and Table 3.4-5. The nearest noise-sensitive land uses are in the city of Boardman (residential zones), and are approximately 0.6 mile (mi.) (0.96 km) north of the northern border of NWSTF Boardman (approximately 5 mi. north of the main target area [see Figure 2-1] where the majority of noise generating activities occur). The land use along the eastern boundary of NWSTF Boardman is agricultural. Land uses along the western boundary of NWSTF Boardman are conservation areas, agricultural areas, an aviation test facility, and a power plant. The 2010 U.S. Census information for census blocks 9701, 9702, 9601, and 9505, which underlie NWSTF Boardman airspace (Boardman Restricted Area Airspace and MOA), indicate there are approximately 3,344 residences under the NWSTF Boardman Airspace (Table 3.4-5). It is important to note that the census blocks do not completely align with NWSTF Boardman airspace, and many of the sub-blocks of the census blocks only partially underlie the airspace due to their configuration. Most of the residences are concentrated in residential zones within and surrounding the cities of Boardman, Ione, Arlington, Umatilla, and Hermiston.

Table 3.4-5: Populations and Households of Census Tracts that Underlie NWSTF Boardman Airspace

Census Tract	Block Group	Population	Households
9505	BG 3	507	213
9509	BG 3	1986	732
9510	BG 1	775	276
9511	BG 1	670	268
9601	BG 1	850	465
9601	BG 2	381	289
9701	BG 1	2343	863
9701	BG 2	1496	539
9701	BG 3	822	317
9701	BG 4	1657	502
9701	BG 5	1680	536
9702	BG 1	633	249
9702	BG 2	533	255
9702	BG 3	566	270

Note: Census information from 2010 United States Census.

Any residential zone (or residences outside those zones), hospital, education facility, recreational areas, or libraries that underlie the FAA Special Use Airspace (SUA) designated for NWSTF Boardman would be considered sensitive receptors, potentially receiving noise from aircraft activities utilizing the NWSTF Boardman airspace during training activities. As indicated in Figure 3.4-4, there are three schools and one library that underlie the NWSTF Boardman SUA (all within the City of Boardman): Sam Boardman Elementary School, Windy River Elementary School, Riverside Junior/Senior High School; and the Boardman City Library. The land use zones on both the eastern and western sides of NWSTF Boardman are not considered noise-sensitive, as they are classified as agricultural use.

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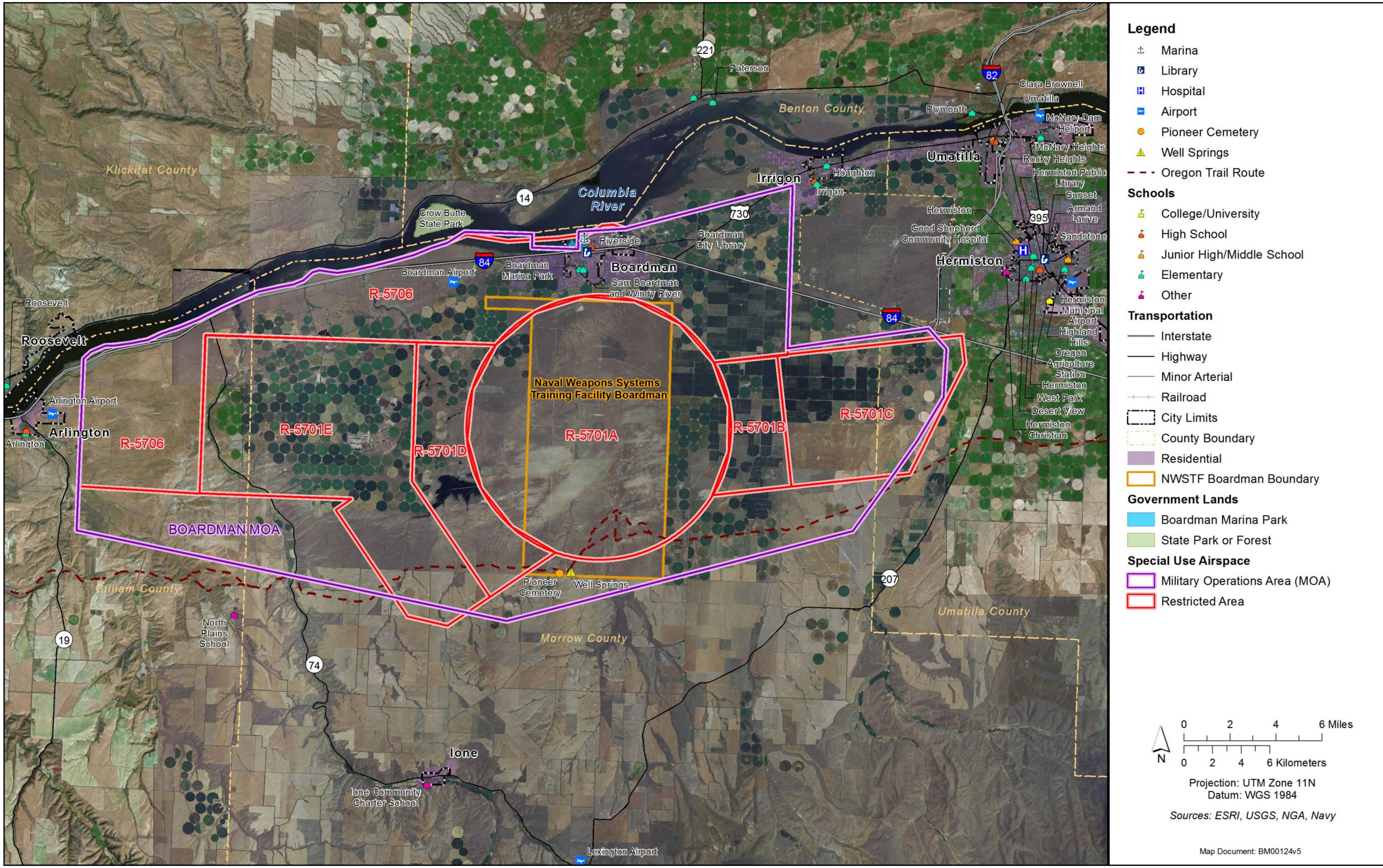

Figure 3.4-4: Sensitive Receptors

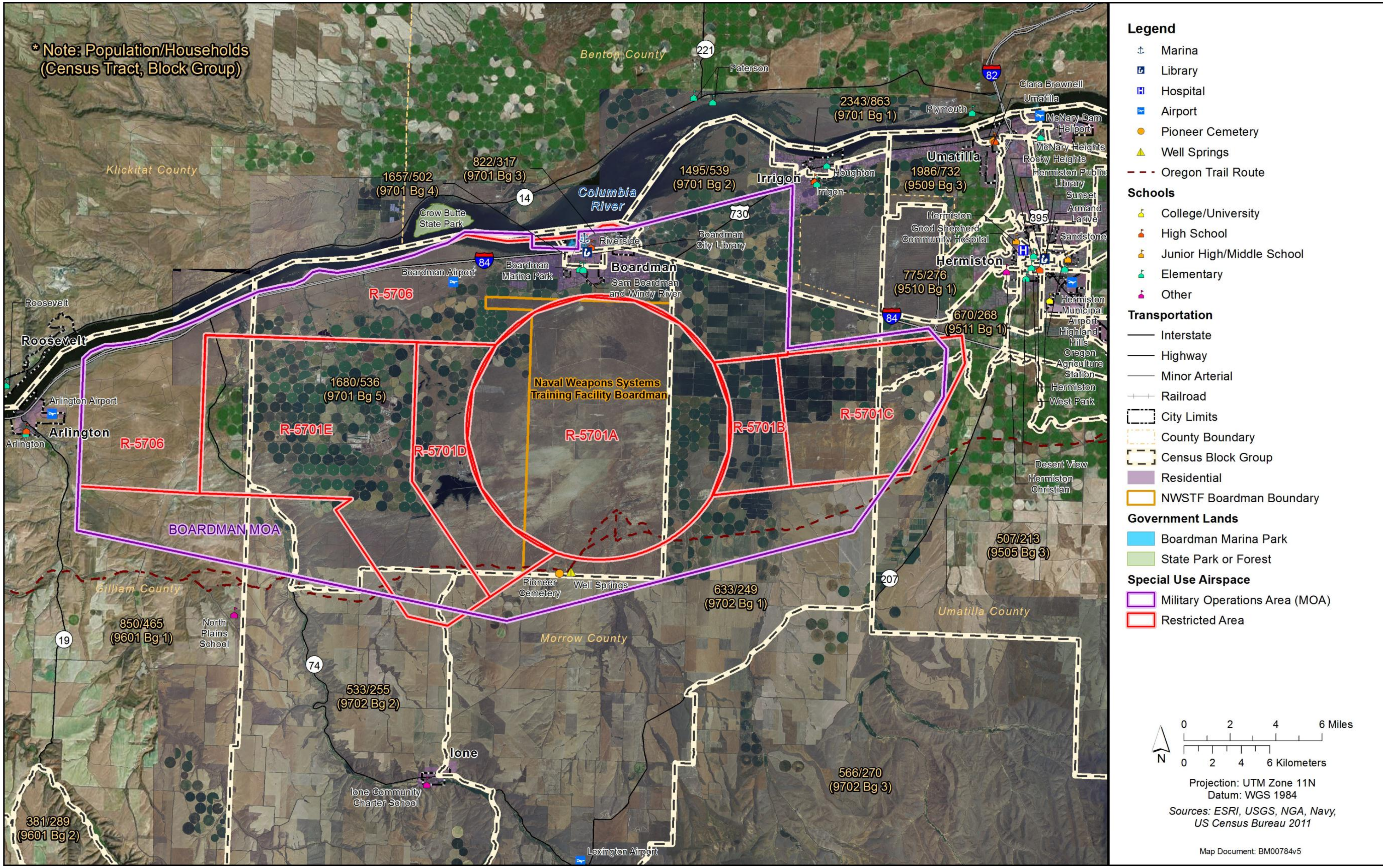

Figure 3.4-5: United States Census Data and NWSTF Boardman Airspace

3.4.2.2 Existing Sound Conditions

Current noise sources in the vicinity of NWSTF Boardman include fixed-wing aircraft, helicopters, and vehicular traffic on Interstate 84 passing through the Boardman area, agricultural activities, and operational noise from regional wind farms, as well as occasional small arms training at NWSTF Boardman. These sources of noise are relatively slow onset sounds with continuous noise levels, with the exception of impulse noise from weapons firing.

3.4.2.3 Current Requirements and Management Practices

Activities at NWSTF Boardman comply with standard operating procedures (Visual Flight Rules [VFR], Instrument Flight Rules, and Naval Air Training and Operating Procedures Standardization [NATOPS] Publications) to ensure that neither participants nor non-participants engage in activities that would endanger life or property. Aircraft standard operating procedures are largely oriented toward safety, which also provide significant noise abatement benefits. For example, many standard operating procedures involve flight routing and minimum altitudes. Each of these procedures increases the range of the noise source from human receptors, thus reducing noise impacts. Noise control and abatement programs are developed to minimize noise impacts whenever practicable through implementation of operational alternatives that do not degrade mission requirements or aircraft safety to identify and address incompatible development in areas that are in the vicinity of air installations.

Navy occupational noise exposure prevention procedures (OPNAVINST 5100.23, Navy Safety and Occupational Health Program Manual; DoD 6055.12, DoD Hearing Conservation Program) are required at NWSTF Boardman for those military personnel who might be exposed to occupational hearing hazards (e.g., military aircraft operations or land detonations). These measures are designed to minimize occupational hearing hazards and ensure there is no risk of hearing impacts from occupational noise exposure.

3.4.3 Environmental Consequences

The primary factor considered in determining the significance of potential noise impacts includes the extent or degree to which implementation of the Proposed Action would affect the baseline sound environment, as described in Section 3.4.1.7 (Determination of Significance). Concerns over noise include hearing loss, non-auditory health effects, annoyance, speech interference, and sleep interference. Training activities at NWSTF Boardman do not generate noise at intensities that could contribute to hearing loss in off-site public areas, so this issue is not further addressed. However, the potential effects would be conversation interruption, sleep interference, distraction, and annoyance, which can be estimated from the analysis of noise contours and noise zones. Based on numerous sociological surveys, and recommendations of federal interagency councils, the most common benchmark for assessing environmental noise impacts is a DNL of 65 dB for A-weighted sound (Schomer 2005, Federal Interagency Committee On Noise 1992). When subjected to sound levels of 65 dBA DNL, approximately 12 percent of exposed individuals would be “highly annoyed.” A sound level of 75 dBA DNL is a threshold above which effects other than annoyance can occur.

An additional issue of concern with regard to noise is the potential for impacts on biological resources (terrestrial wildlife). Potential noise impacts on biological resources are discussed in Section 3.6 (Wildlife). A discussion of noise impacts on land use is presented in Section 3.7 (Land Use and Recreation).

As presented in Tables 3.0-2 and 3.0-3, the stressor analyzed in this section is noise. However, since many components of noise are addressed differently (see Section 3.4.1.6.1, Time-Averaged Sound Levels), the analysis within this section is broken down into categories, or sub-stressors. These categories are noise from vehicles, noise from construction, and noise from training activities (aviation and range noise).

3.4.3.1 No Action Alternative

3.4.3.1.1 Vehicle Noise

Current vehicle use associated with training activities is not a substantial noise source for sensitive receptors in the surrounding areas and community of Boardman. As described in Section 2.3.1 (Description of Current Training and Testing Activities at NWSTF Boardman), the majority of activities occurring under the No Action Alternative are aerial in nature, with the exception of Live Fire Range Activities (marksmanship and small arms training) and Dismounted Maneuver Training (maneuver to conduct Live Fire Training). As listed in Table 2-1, there are 13 days per year that Small Arms Training occurs at NWSTF Boardman. Vehicles carrying military personnel to NWSTF Boardman would arrive via Interstate 84, the only high-volume, high-speed road in the area, before exiting on Bombing Range Road. The low number of vehicle trips associated with training activities under the No Action Alternative represents an extremely low percentage of the average traffic volume on Interstate 84. The No Action Alternative would mean that there is no change in the number of vehicles in use.

3.4.3.1.2 Training Noise

Noise from training activities at NWSTF is generated from a variety of sources. Under the No Action Alternative, and as presented in Tables 2-1 and 2-3, noises associated with training include aircraft and small arms training occurring on established ranges or target areas on NWSTF Boardman.

Aircraft Noise

Under the No Action Alternative, about 1,815 aircraft sorties per year (fixed-wing, helicopter, and unmanned aircraft systems [UAS]) would be flown for training within the NWSTF Boardman restricted airspace, or about 5 sorties per training day. Under the No Action Alternative, aircraft involved in aerial training activities would be present somewhere in the restricted airspace for about 5,255 hours per year (see Table 2-4 for numbers, and Figure 3.4-6 and Figure 3.4-7 for representative flight paths). One reason for this seemingly high number is because more than one aircraft may be in the airspace at one time, hence multiple flight hours during one real hour. Also, for estimation purposes within this EIS, sorties that occur for any portion of an hour of flight time are counted as a full hour. Most of the aircraft utilized in support of training activities at NWSTF Boardman are the EA-6B Prowler and the EA-18G Growler. The EA-6B Prowler is the most common fixed-wing aircraft used for aerial training activities (about 79 percent of on-range time of fixed-wing aircraft). An EA-6B Prowler produces a SEL of about 100 dBA, at a distance of 5,000 ft. (0.95 mi.) during an overflight, which is transient in nature and brief in duration. The EA-18G Growler is an electronic combat version of the FA-18 E/F that is currently replacing the EA-6B Prowler (and which will be replaced completely under Alternatives 1 and 2). The advanced capabilities of the EA-18G Growler weapons systems require wider use of the existing training airspace and broader frequency spectrum access than the EA-6B Prowler systems.

The EA-18G Growler noise profile is based on extensive noise measurements taken from actual FA-18E/F Super Hornets (both in flight and on the ground) because the EA-18G Growler was derived directly from the FA-18F Super Hornet, a proven aircraft platform. They share the same airframe and engine, and have approximately the same in-flight weight. In order to properly compare noise levels between the EA-6B

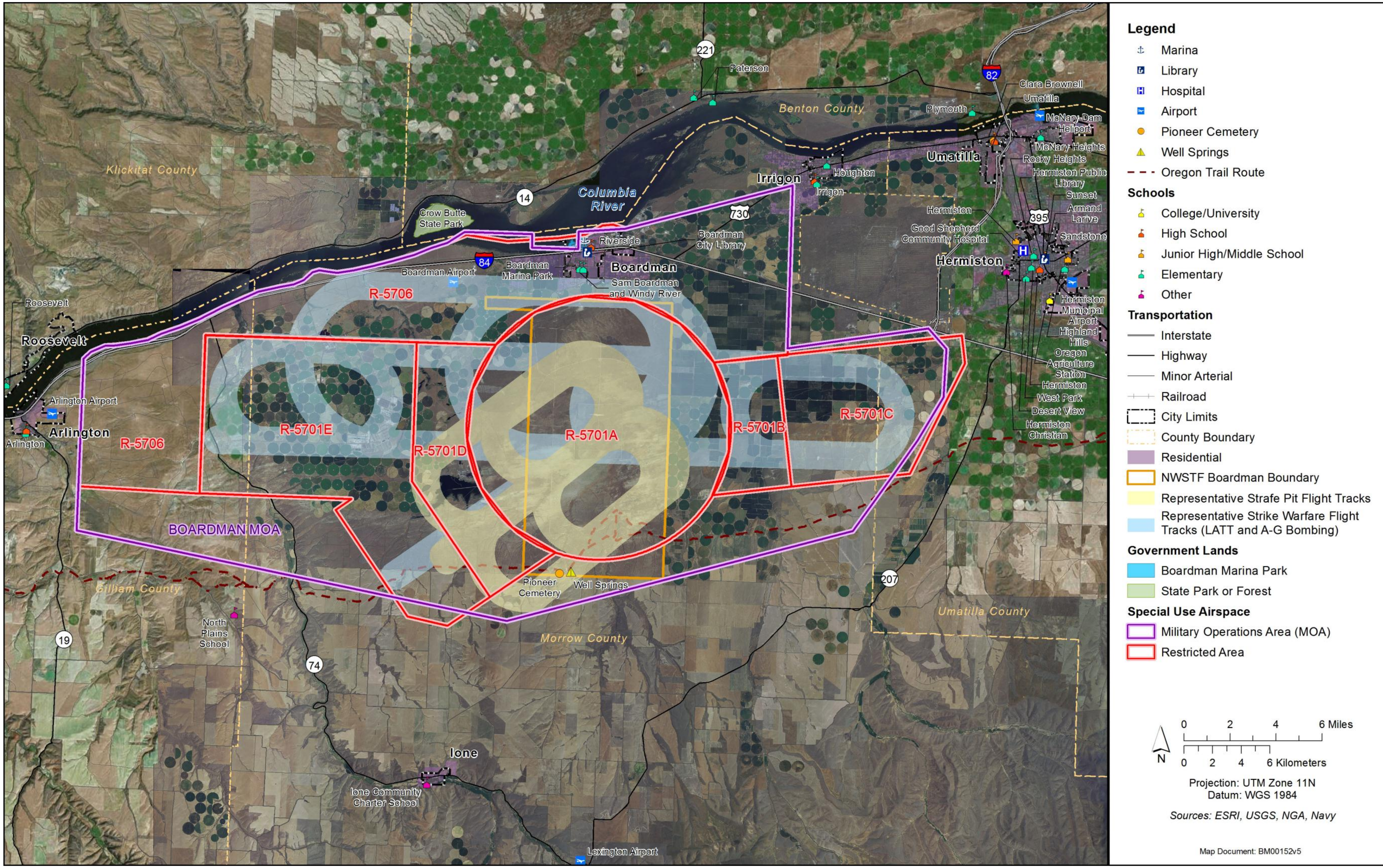

Figure 3.4-6: Existing Representative Flight Tracks at NWSTF Boardman

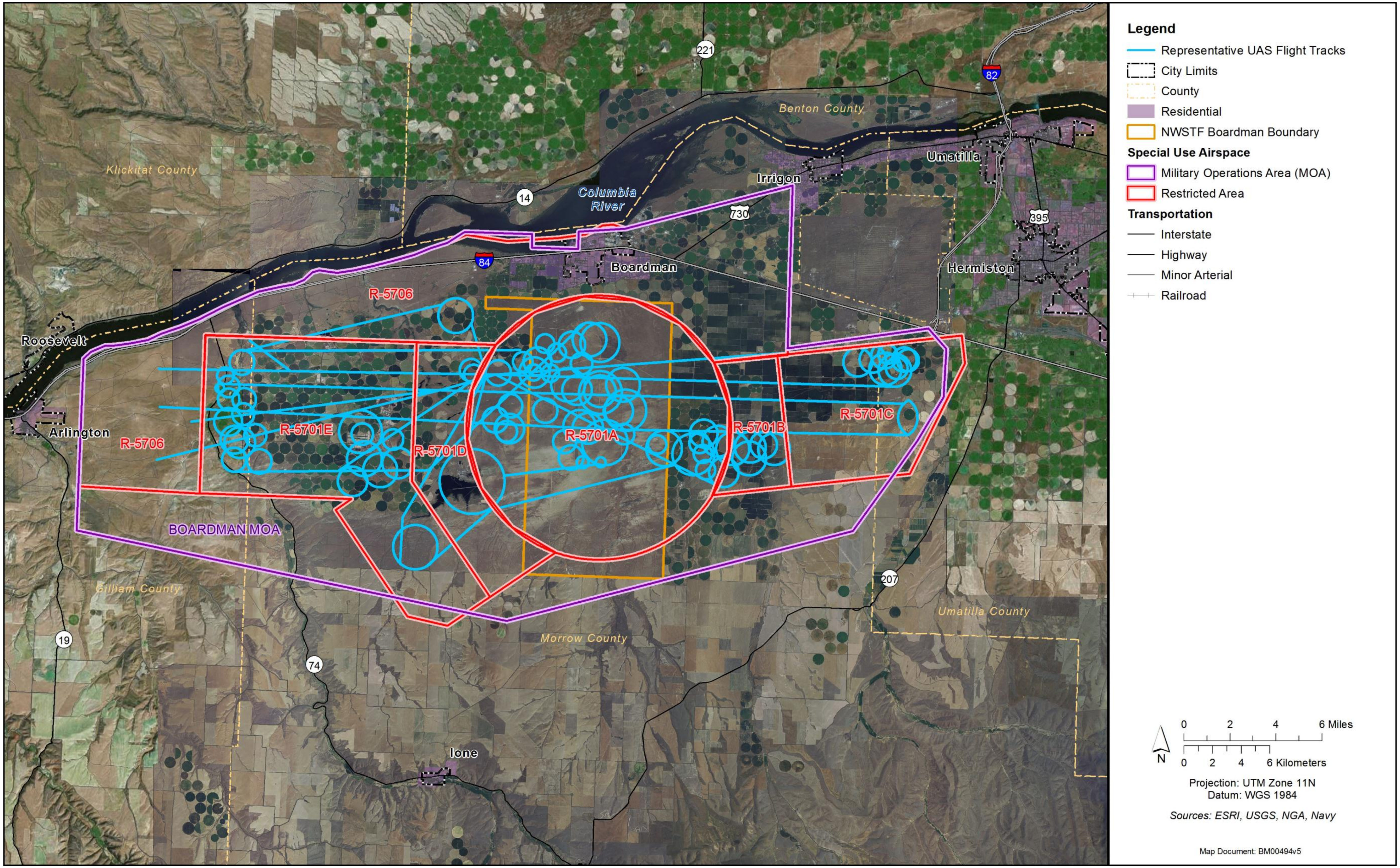

Figure 3.4-7: Existing Unmanned Aircraft Systems Flight Tracks at NWSTF Boardman (Representative)

Prowler and the EA-18G Growler, extensive noise analysis of the EA-6B Prowler was completed in 2003 to ensure the Navy had updated measurements. With updated reference noise data available, an operational noise comparison between the EA-6B Prowler and EA-18G Growler was conducted for NAS Whidbey Island and OLF Coupeville in May 2004. This study evaluated and compared the noise modeled from normal flight operations and ground run-ups of the EA-6B Prowler and EA-18G Growler. The comparisons of sound levels demonstrated that the EA-18G Growler generated less flight noise than the EA-6B Prowler. This noise reduction is driven by the better flight characteristics of the EA-18G Growler. While the two aircraft sound different, the EA-18G Growler has similar or lower sound levels under most conditions, and the EA-18G Growler climbs away from the ground more quickly than the EA-6B Prowler.

For the No Action Alternative the ratio of sorties between these aircraft is approximately 70 and 30 percent for the EA-6B Prowler and the EA-18G Growler, respectively (Alternatives 1 and 2 assume the transition is complete and only model the EA-18G Growler). Noise measurements show that Growler noise levels are similar to those of the Prowler. As presented in Appendix E, unweighted sound exposure levels (SEL) and maximum unweighted sound levels (L_{max}) were computed for single events for each of the modeled aircraft. The existing EA-6B Prowler aircraft are up to 11 dB greater in SEL and 9 dB greater in L_{max} than the EA-18G Growler, which will replace it. (Appendix E, Noise Report, contains the full details on overflight noise levels).

Table 3.4-6: Estimated A-Weighted Sound Exposure Level (dBA) of Single Aircraft Overflights

Air-craft Type	Model-ed Aver-age Speed (KIAS)	Model-ed Aver-age Power Setting	Altitude (feet AGL)									
			200		500		1,000		5,000		10,000	
			SEL	L_{max}	SEL	L_{max}	SEL	L_{max}	SEL	L_{max}	SEL	L_{max}
Fixed-Wing												
EA-6B Prowler	400	*90% NC*	132	132	125	121	118	112	100	90	91	79
F-15E	400	*90% NC*	123	120	116	111	111	104	96	85	85	75
F-16C	400	*90% NC*	120	120	113	111	108	103	92	84	84	73
EA-18G* Growler	400	*90% NC*	121	124	116	115	112	108	98	88	90	76
AV-8B	400	*90% RPM*	112	114	105	104	99	96	80	73	70	62
Helicopters												
CH-47	120	*n/a*	104	102	100	94	97	87	87	71	81	63
UH-60	120	*n/a*	95	93	90	84	87	78	75	60	68	50

* The EA-18G Growler is an electronic combat version of the FA-18 E/F that will replace the EA-6B Prowler.
Notes: (1) AGL = Above Ground Level, RPM = Revolutions Per Minute, NC = Engine Core RPM, SEL = Sound Exposure Level, L_{max} = Maximum unweighted sound level (decibels), n/a = not applicable. (2) EA-18G Growler modeled as FA-18E/F. F-15E modeled with F100-PW-229 engine. F-16C modeled with F100-PW-220 engine. UH-60 modeled as SH-60B.

Under the No Action Alternative, the EA-6B Prowler and EA-18G Growler (which are the primary aircraft used for Low-Altitude Tactical Training [LATT]) account for approximately 35 percent of all aircraft sorties (649 of 1,815 total sorties, Table 2-4), averaging just over 2 sorties per day. Further, as presented in Table A-1 of the noise study (Appendix E), less than 10 percent of all LATT activities would occur at elevations less than 500 ft. (152.4 m) above ground level (AGL). None of the manned, fixed-wing aircraft are flown at elevations less than 200 ft. (61 m) AGL. Therefore, fewer than 65 LATT sorties would occur at elevations between 200 and 499 ft. (61 and 152.1 m) AGL annually. Additionally, flight activities are restricted to daytime periods (0700–2200 except for LATT activities, which are further restricted to 2 hours after sunup and 2 hours before sundown).

The largest proportion of sensitive receptors is within the City of Boardman. As indicated in Figure 3.4-4, there are three schools and one library that underlie the NWSTF Boardman SUA (all within the City of Boardman): Sam Boardman Elementary School, Windy River Elementary School, Riverside Junior/Senior High School, and the Boardman City Library. It is important to note that the City of Boardman, including the three schools and one library, lie underneath Restricted Area 5706. This airspace has a minimum altitude restriction of 3,500 ft. (0.66 mi.) AGL, meaning an aircraft cannot fly below that altitude. At this altitude, received sound exposures level from fixed-wing overflights (an EA-6B Prowler, for example) would be between 100 and 118 dBA (see Table 3.4-6). It is important to note that the SEL is a composite metric that represents both the intensity of a sound and its duration. During an aircraft flyover, SEL captures the total sound energy from the beginning of the acoustic event to the point when the receiver no longer hears the sound. It condenses that energy into a 1-second period of time, and the SEL metric represents the total energy received. A typical overflight of a fixed-wing aircraft (the period in which the aircraft can be heard) may last longer than 1 second; thus, the actual sound levels that reach the receiver may be lower than the SEL. The $L_{max,}$ which is the loudest level during the noise event (in this case, the instantaneous maximum sound level measured/heard during an aircraft flyover, again using the EA-6B Prowler as an example), would range from 90 to 112 dB. The short-duration overflights of military aircraft over public areas under the restricted airspace (e.g., City of Boardman, sensitive receptors, recreational areas) would constitute discrete noise events that, while noticeable because they would exceed the background noise level, would contribute very little to the hourly average noise level.

Most of the helicopter support for training activities at NWSTF Boardman is provided by the CH-47 and UH-60 helicopters and is concentrated over NWSTF Boardman itself. The CH-47 helicopter (typical for training activities at NWSTF Boardman) can produce single-event pass-by SELs approaching 87 dBA at 5,000 ft. (0.95 mi.) from the source (see Table 3.4-6), although the L_{max} for the CH-47 at that altitude is approximately 71 dB. These noise levels are assumed to be reasonably representative of the average noise emissions from the types of helicopters used in training at NWSTF Boardman. However, these flights represent only 4 percent of all aircraft sorties (72 of 1,815 total sorties, see Table 2-4).

UAS are also utilized at NWSTF Boardman (Figure 3.4-7), including the RQ-7 Shadow, RQ-11 Raven, and the ScanEagle. The ScanEagle is the most commonly used UAS during training activities (about 96 percent of UAS use). Typically (approximately 85 percent of flight time), training activities would be conducted at or above 3,000 ft. (914.4 m) AGL. For reference, at a distance of 28 ft. (8.5 m), the received level from a Shadow UAS is approximately 108 dBA; at 204 ft. (62.2 m), the received level drops to 85 dBA. Once the UAS reaches approximately 3,000 ft. (914.4 m) AGL, the Shadow would no longer be heard on the ground (Army National Guard 2008). The Shadow climbs at a rate of 500–1,000 ft. (152.4–304.8 m) per minute; at 3–6 minutes after takeoff, the noise would not be heard on the ground. The ScanEagle UAS is designed to be a quieter model than the Shadow and, thus, noise levels would be inaudible at a lower altitude than that of the Shadow. Because of the limited levels of noise and distance from the City of Boardman that operations typically occur (Figure 3.4-7), no residences, communities, or sensitive noise receptors would experience any notable change to the overall noise environment. Under the No Action Alternative, UAS platforms account for approximately 49 percent of all aircraft sorties (896 of 1,815, Table 2-4). Approximately 74 percent of the 5,255 flight hours under the No Action Alternative (see Table 2-4) involve UAS. Of these flights, approximately 85 percent of their time in the air is at or above 3,000 ft. (914.4 m) with little to no discernible noise at ground level.

While single overflight events constitute discrete intrusive noise events which may cause temporary distraction or annoyance, their contribution to the overall hourly noise levels would be extremely low. As most UAS activity is at or above 3,000 ft. (914.4 m), their contribution to the noise levels is negligible. The remaining sorties (approximately 919 of 1,815 sorties) could contribute to elevated noise levels on the ground. As indicated in Table 2-4, roughly one-third of these remaining sorties would occur at elevations at or above 3,000 ft. (914.4 m). Aircraft operations at these elevations are not expected to significantly contribute to the noise levels heard on the ground. Approximately 854 flight hours of aircraft activities are expected to contribute to the community noise levels annually.

Though the anticipation is that only a small percentage of all aircraft activity would contribute to the noise environment, noise modeling was performed for all aircraft activities conducted under the No Action Alternative at NWSTF Boardman (Figure 3.4-8). The noise modeling utilized the DoD computer-based programs MOA and Range Noise Model (MR_NMAP; Version 2.2) for analysis of aircraft and compatible land uses. The program is most accurate and useful for comparing “before-and-after” noise levels that would result from scenarios when calculations are made in a consistent manner. The programs allow noise exposure prediction of such proposed actions without actual implementation and/or noise monitoring of those actions (see Appendix E for full modeling details). Science supports noise modeling as the best way to predict noise exposure levels around airfields. All aircraft considered in noise modeling have gone through actual noise measurements, creating a noise library that is used in noise modeling. Noise modeling is conducted according to established Department of Defense (DoD) guidelines and best practices. It involves extensive data collection, validation, and analysis, and is subject to rigorous technical and quality assurance processes.

Military aircraft utilizing SUA such as Military Training Routes (MTRs), MOAs and Restricted Areas/Ranges, generate a noise environment that is somewhat different from that associated with airfield operations. As opposed to patterned or continuous noise environments associated with airfields, flight activity in SUAs is highly sporadic and often seasonal ranging from 10 per hour to less than one per week. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset, exhibiting a rate of increase in sound level (onset rate) of up to 150 dB per second. To represent these differences, the conventional SEL metric is adjusted to account for the “surprise” effect of the sudden onset of aircraft noise events on humans with an adjustment ranging up to 11 dB above the normal SEL. Onset rates between 15 and 150 dB per second require an adjustment of 0–11 dB, while onset rates below 15 dB per second require no adjustment. The adjusted SEL is designated as the onset-rate adjusted sound exposure level (SEL_r). Because of the sporadic characteristic of SUA activity, noise assessments are normally conducted for the month with the most operations or sorties—the so-called busiest month. The cumulative exposure to noise in these areas is computed by the DNL over the busy month, but using SEL_r instead of SEL. This monthly average is denoted L_{dnmr}.

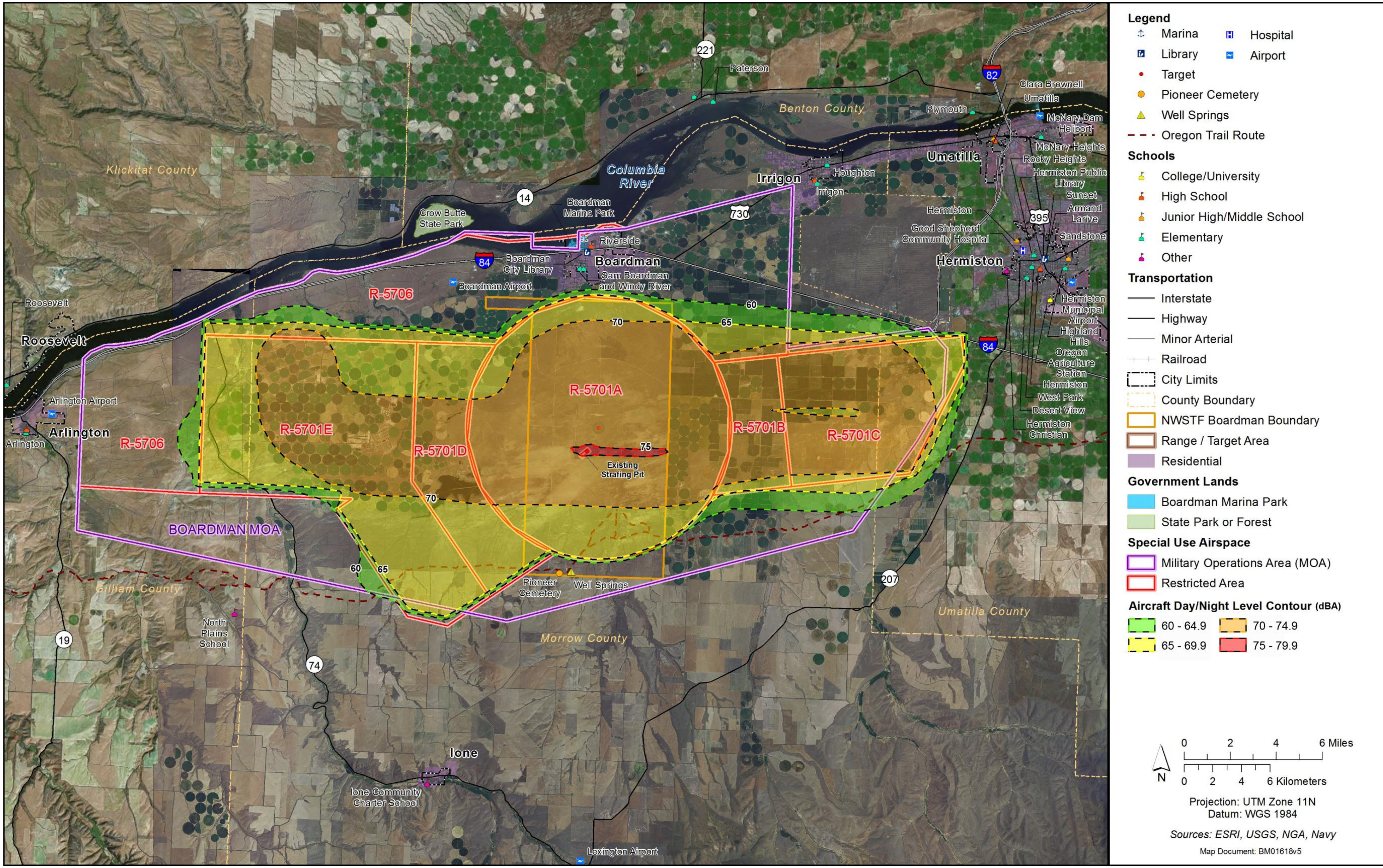

Figure 3.4-8: Aircraft Day-Night Level Contours (No Action Alternative)

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The MR_NMAP program (a flight track and area noise model that allows for entry of airspace information, the distribution of operations, flight profiles [average power settings, altitude distributions, and speeds], and numbers of sorties) incorporates the number of monthly operations by time period, specified distributions, volume of the airspaces, and profiles of the aircraft to primarily calculate: (a) L_{dnmr} at many points on the ground, (b) average L_{dnmr} for entire airspaces, or (c) maximum L_{dnmr} under MTRs or specific tracks. From the grid of points, lines of equal L_{dnmr} (contours) of 60 dBA through 75 dBA, in 5 dBA increments, were plotted. Figure 3.4-8 shows the community L_{dnmr} levels based on the number of activities listed under Table 2-4. As explained previously in this document, Noise Zone I includes all areas in which the DNL from aviation activities is below 65 dBA, Noise Zone II includes all areas in which the DNL is between 65 and 75 dBA, and Noise Zone III includes all areas in which the DNL is above 75 dBA. The noise levels presented in Figure 3.4-8 are representative of the DNLs from the most active month of training (L_{dnmr}) for the most conservative estimate of noise impacts (e.g., representative of the loudest noise conditions).

Sound levels up to 65 dBA are considered to be compatible with land uses such as residences, transient lodging, and medical facilities. However, as displayed in Figure 3.4-8, under the No Action Alternative, the majority of lands that are underneath Restricted Area R5701 (A through E) have a DNL greater than 65 dBA (approximately 287.1 square miles [(mi.^{2}]) (743.6 square kilometers [km^2]). A portion of this area (172.4 mi.^{2} [446.5 km^2]) has a DNL ranging from 70 to 75 dBA, which is indicated by the orange area on the figure. The land use categories defined by Federal Regulation Part 150 as not being compatible with these noise levels include residences, mobile home parks, transient lodging, schools, and hospitals and churches (14 C.F.R. Part 150, Table 1). DNLs greater than 75 dBA are restricted to areas within the NWSTF Boardman boundary (approximately 1.36 mi.^{2}). The City of Boardman, including the schools, libraries, and sensitive areas, lies outside of the 65 dBA DNL contour and thus the land would fall into Noise Zone I (Figure 3.4-9).

Visual inspection of aerial maps of the areas within regions where the DNL is in excess of 65 dBA reveals that the majority of the area is utilized for agricultural purposes, which is a compatible land use in Noise Zone II (noise levels between 65 and 75 dBA). However, several residences (47 identified from satellite imagery) or other sensitive receptors were identified, most notably on lands underneath Restricted Areas R5701C and R5701E.

For comparison with the Action Alternatives, Table 3.4-7 presents the approximate uniform population density for each census tract and block group as well as the area of each tract/block that underlies DNL contours. For example, Census Tract 9701, Block Group 5 has an approximate area of 252 mi.^{2} (652.7 km^2) and a population of 1,680 individuals. For the purpose of analyzing potential changes in affected population (i.e., when comparing to the Alternatives), a uniform distribution of individuals was assumed, resulting in a population density of 6.67 individuals per square mile for Census Tract 9701, Block Group 5. While population centers typically exhibit patchy distribution, the assumption of uniform population distribution in the Boardman area allows for conservative estimates of overlap.

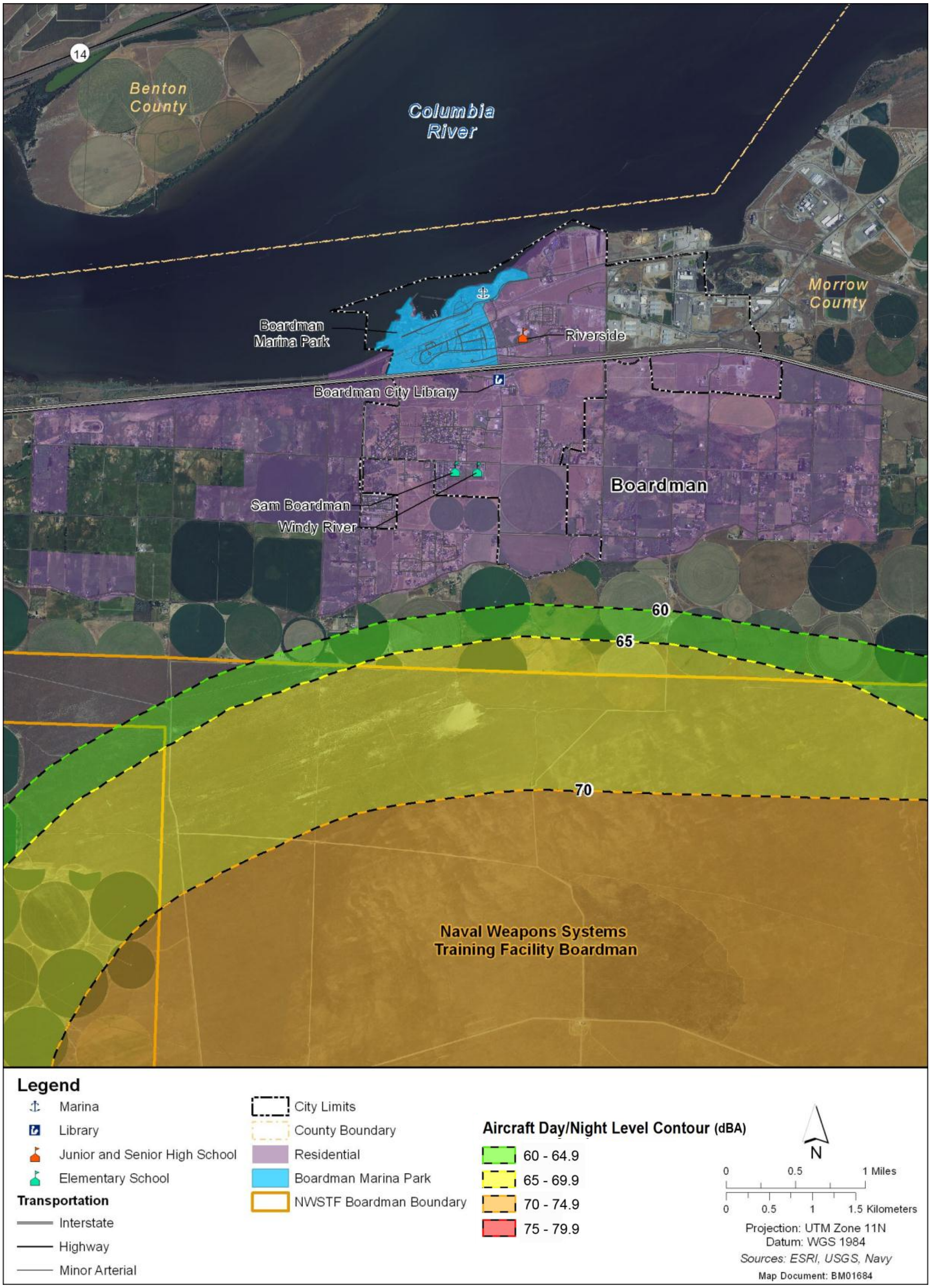

Figure 3.4-9: Aircraft Day-Night Level Contours (No Action Alternative) over the City of Boardman

Table 3.4-7: Baseline Population Underlying DNL Contours

Census Tract	Block Group	Density (Pop/mi.^{2})	Area Under Contour (mi^2)			Population Under Contour		
			>65 dB	>70 dB	>75 dB	>65 dB	>70 dB	>75 dB
9505	BG 3	1.25	13.32	8.91	0	17	11	0
9511	BG 1	39.77	5.84	2.57	0	232	102	0
9601	BG 1	1.96	14.70	0	0	29	0	0
9701	BG 5	6.67	177.99	106.47	1.36	1,186	710	9
9702	BG 1	2.26	71.23	54.42	0.0005	161	123	0
9702	BG 2	1.99	4.00	0	0	8	0	0

Notes: BG = Block Group, dB = decibel(s), mi.^{2} = square mile(s)

The area of each DNL contour (>65 dBA, >70 dBA, and >75 dBA) was calculated for each Tract/Block group and multiplied by the approximate uniform population density of that Tract/Block to result in the approximate number of individuals under each DNL contour. Under the No Action Alternative and assuming a uniform population distribution, approximately 1,633 individuals would be in areas where the DNL is greater than 65 dBA, approximately 946 individuals would be in areas where the DNL is greater than 70 dBA, and approximately 9 individuals would be in areas where the DNL is greater than 75 dBA. In these areas, during busy months of training activities at NWSTF Boardman, noise would interfere with normal activities associated with its use.

Range Noise

Small Arms Noise

Under the No Action Alternative, as listed in Table 2-3, approximately 57,250 small- and medium-caliber rounds would be fired. The majority of munitions used under the No Action Alternative is restricted to the main target area of NWSTF Boardman. Estimated noise levels in Table 3.4-8 depict average SEL noise levels at various distances in the direction of fire from a single event. There are no sensitive receptors within 5 mi. (26,400 ft.) of the areas in which weapons are used, and PK-15 contours were calculated and plotted in Figure 3.4-10. SEL values were calculated using the U.S. Army Corps of Engineers Small Arms Range Noise Assessment Model. The closest community residences are over 5 mi. (8.1 km) distant, and the most proximate school is approximately 6 mi. (9.7 km) away from the main target area where noise-generating events occur. No sensitive receptors are located within the portion of the moderate noise complaint risk area (115–130 dBPK) that extends off of the NWSTF Boardman property. At distances beyond about 2 mi. (3.2 km), noise from the 5.56-millimeter (mm), 7.62 mm, and 20 mm caliber rounds would be at or very close to 65 dBA. Noise from 40 mm and .50 caliber rounds would propagate further, though at the nearest sensitive receptors, noise levels from the firing of these larger-caliber weapons is also expected to be very close to or below typical background sound levels.

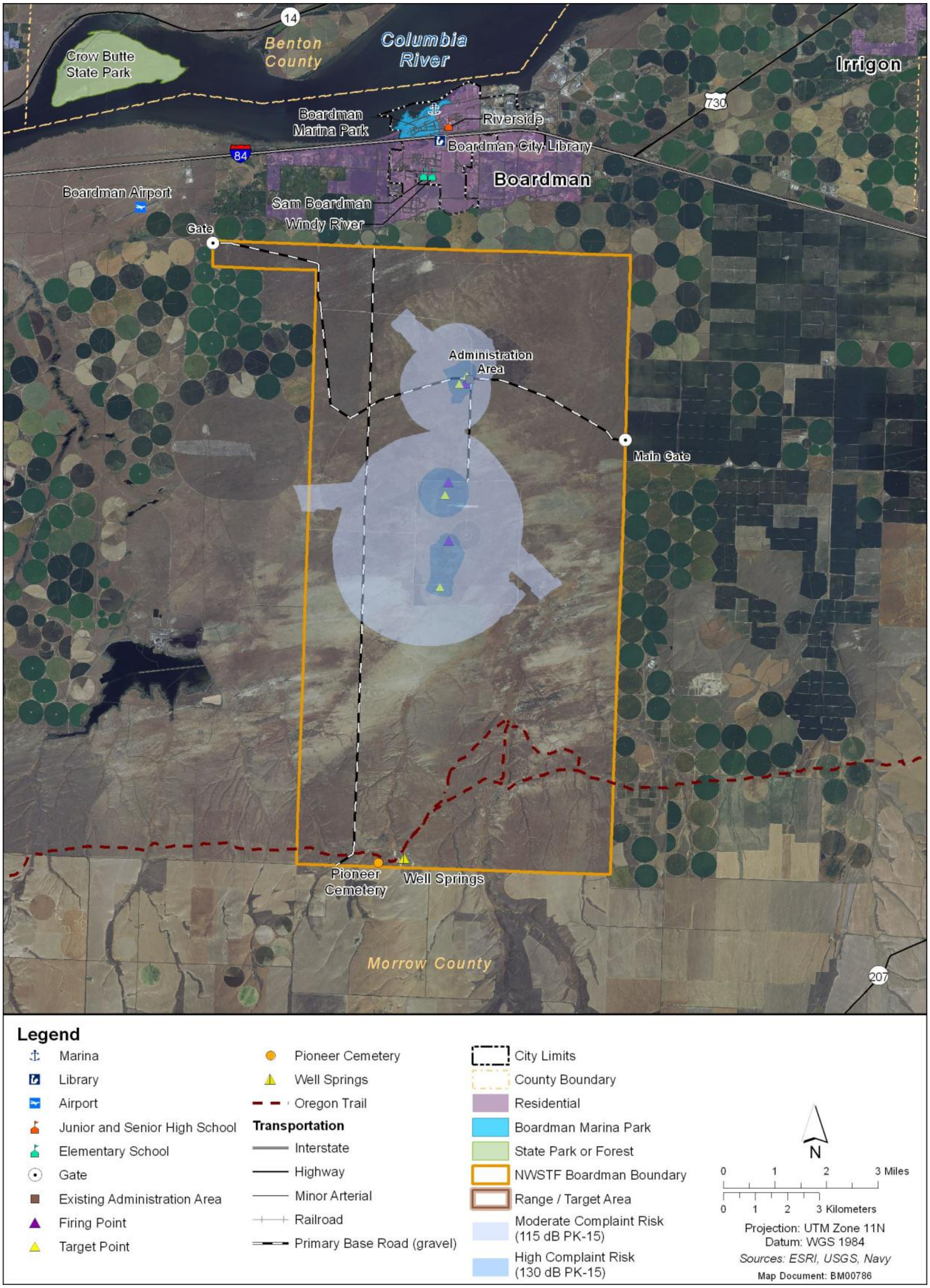

Figure 3.4-10: Projected Complaint Risk Areas from Small Arms Activities under the No Action Alternative

Table 3.4-8: Estimated Sound Exposure Level at Various Distances Generated by Small Arms Weapons Firing

Munition Type	Distance from Source (feet)							
	50	100	200	400	800	1,600	3,200	6,400
5.56 mm	111.8	105.8	99.8	93.8	87.8	81.8	75.8	69.8
7.62 mm	114.3	108.3	102.3	96.3	90.3	84.3	78.3	72.3
20 mm	110.3	104.3	98.3	92.3	86.3	80.3	74.3	68.3
40 mm	119.1	113.1	107.1	101.1	95.1	89.1	83.1	77.1
.50 caliber	121.3	115.3	109.3	103.3	97.3	91.3	85.3	79.3

Notes: (1) Sound Exposure Level values estimated at various distances using the U.S. Army Corps of Engineers Small Arms Range Noise Assessment Model (SARNAM). (2) mm = millimeter.

Impulse and Large Arms Noise

Military training activities include the use of non-explosive practice bombs as well as small- and medium-caliber rounds. A total of 427 non-explosive practice bombs would be dropped annually in the main target area under the No Action Alternative. Practice bombs delivered to targets on NWSTF Boardman are non-explosive, except for small spotting charges, and their ground impacts—generally in the soil surrounding a target but mostly on the target itself—make little noise. The explosive spotting charges in these practice munitions are relatively small, and emit a noise similar to a 12 gauge shotgun shell when they detonate. Projectiles impacting the dirt strafing mounds (see Figure 2-1) also generate very little noise. In general, these sources of noise are not audible beyond the boundary of the Target Area.

The Blast Noise Prediction Model (BNOISE2) was used to calculate and plot the 62 and 70 dB CDNL contours for munitions activities under the No Action Alternative. Figure 3.4-11 shows the resulting CDNL contours. The training activities involve the use of munitions, which generate noise levels between 62 and 70 dB. The 70 dB contour has a diameter of approximately 7,000 ft. (2,133.6 m) centered at the Main Bullseye. In addition, there is an elliptical 70 dB contour approximately 5,000 ft. (1,524 m) in length located over the strafe pit. The 62 dB contour surrounds both the Main Bullseye and the strafe pit with a length of approximately 18,000 ft. (5,486.4 m). Because none of the CDNL contours extend beyond the Boardman range boundary, there are no incompatible land use areas outside of NWSTF Boardman. No sensitive receptors would be impacted by impulse noise from activities conducted under the No Action Alternative. To further assess the potential impact from munitions activities under the No Action Alternative (see Table 2-3), PK-15 contours were calculated and plotted in Figure 3.4-12. The area with a medium and high risk of noise complaints is confined within the NWSTF Boardman boundary.

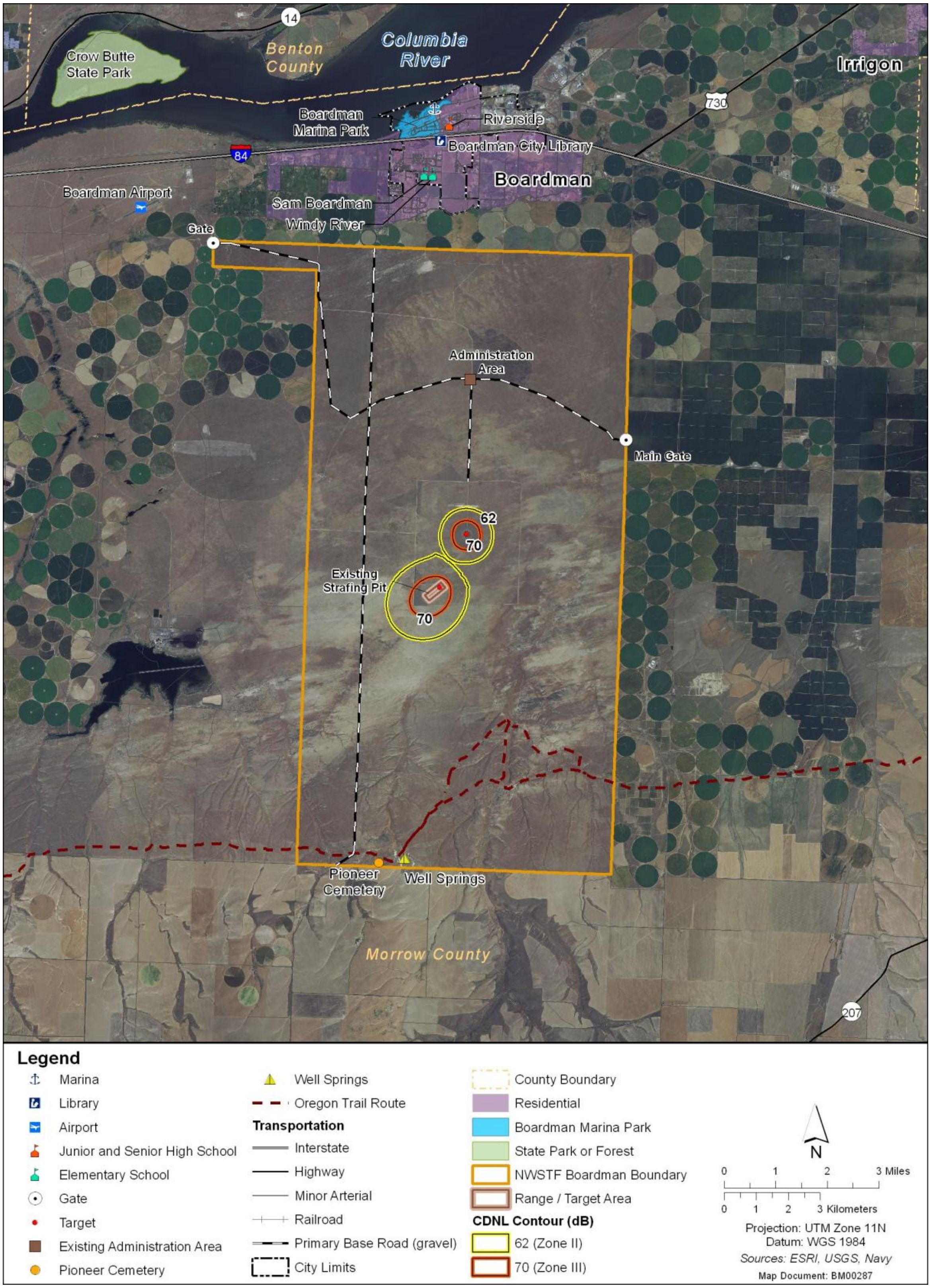

Figure 3.4-11: C-Weighted Average Day-Night Noise Level Contours for Munitions Activities under the No Action Alternative

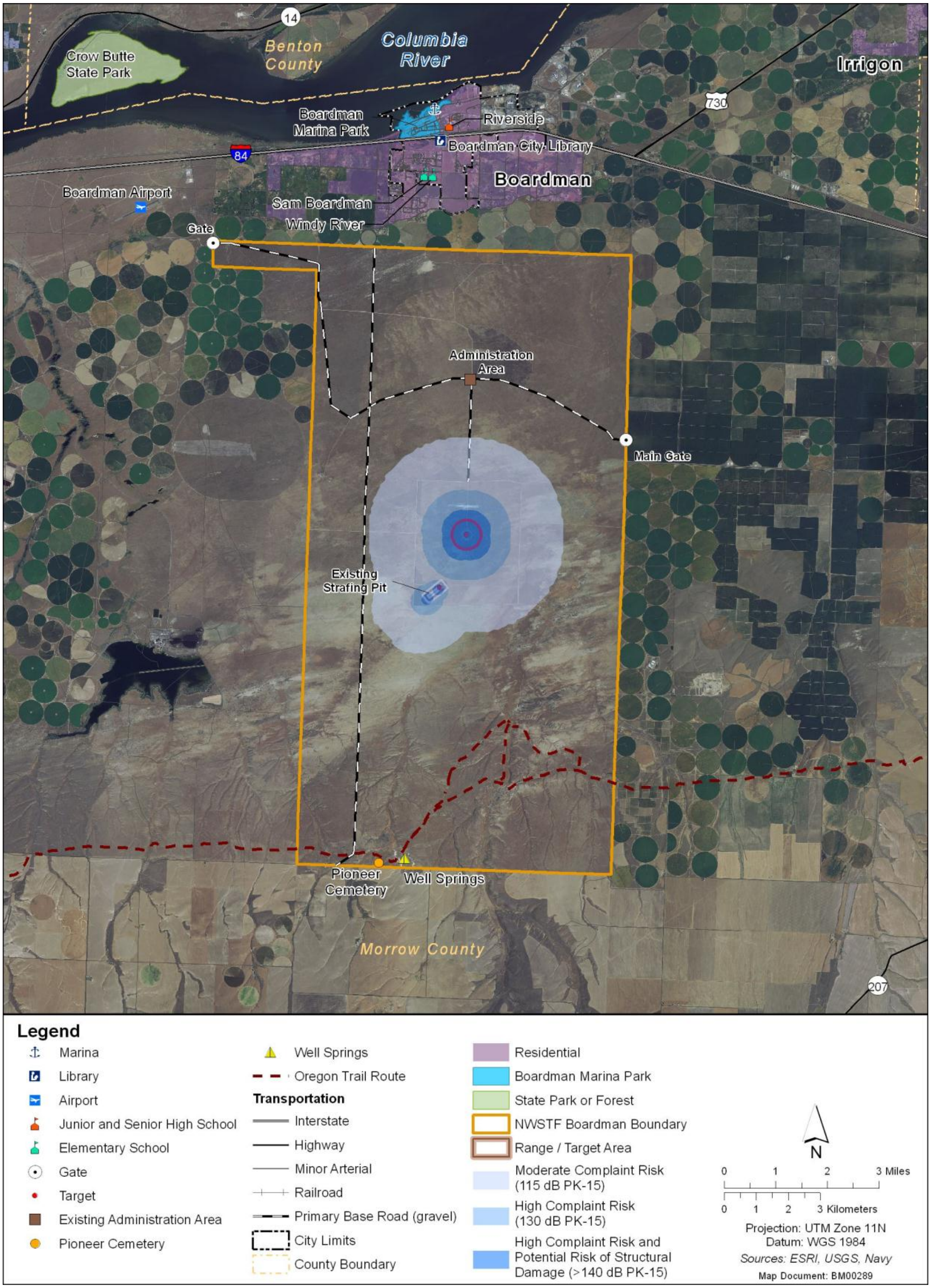

Figure 3.4-12: Projected Complaint Risk Areas from Munitions Activities under the No Action Alternative

3.4.3.1.3 Summary

Overall, existing military training activities on NWSTF Boardman include several sources of noise that would be audible in adjacent agricultural and open space areas surrounding NWSTF Boardman. Major sources of noise include helicopters and fixed-wing aircraft involved in air warfare, electronic combat, strike warfare, and insertion/extraction training activities, as well as other impulsive noise events associated with live-fire activities involving small- and medium-caliber weapons. Because none of the CDNL contours from live-fire events extend beyond the Boardman range boundary, there are no incompatible land use areas outside of NWSTF Boardman. No sensitive receptors would be impacted by impulse noise from activities conducted under the No Action Alternative.

Aircraft training activities on NWSTF Boardman occur primarily during the day, whereas individuals are most sensitive to noise at night. The areas surrounding NWSTF Boardman are primarily agricultural, and, thus, very few members of the public are exposed to noise from training activities on NWSTF Boardman. However, visual inspection of aerial maps of the areas within regions where the DNL is in excess of 65 dBA reveals several structures, most notably on lands underneath Restricted Areas R5701C and R5701E. Given that the City of Boardman, including the schools, libraries, and sensitive areas, lies outside of the 65 dBA DNL contour and thus the land would fall into Noise Zone I (Figure 3.4 8), there would be no significant impact as a result of the No Action Alternative.

3.4.3.2 Alternative 1

3.4.3.2.1 Vehicle Noise

Under Alternative 1, additional ground-based training would occur at NWSTF Boardman. In support of this training, personnel and equipment would typically be transported from Umatilla Chemical Depot (UCD) prior to the start of training activities and would be transported back to UCD at the completion of training. Vehicles used for transporting personnel and equipment would include vans, buses, and semis. Personnel and equipment also could be transported directly to NWSTF Boardman from other locations, including directly from Oregon National Guard (ORNG) facilities, such as individual readiness centers or the Portland Air National Guard Base. Future traffic volume increases on Interstate 84 (the only high-volume, high-speed road in the area) associated with training on NWSTF Boardman would be insufficient to noticeably affect noise levels in the areas surrounding NWSTF Boardman. Increases in vehicle traffic on other local roads, being limited to a few minutes each occurrence, would likewise have no substantial effect on noise levels. Military traffic on local roads would be a minor portion of this traffic. Thus, training and range-related traffic noise would not substantially affect the noise environment under Alternative 1.

3.4.3.2.2 Construction Noise

Under Alternative 1, several range enhancements are proposed which include construction activities. Typical noise levels of commonly used construction equipment are presented in Table 3.4-9.

The construction equipment would be used to develop the Multipurpose Machine Gun Range (MPMGR) and associated Range Operations and Control Area (ROCA), the Digital Multipurpose Training Range (DMPTR) and associated ROCA, an eastern Convoy Live Fire Range (CLFR), Demolition Training Range (DTR), and UAS Training and Maintenance Facility (see Figure 2-2). All proposed construction locations are at least 1 mile from the boundary of NWSTF Boardman, with the exception of the eastern CLFR, which ranges from 0.5 to 1.0 mi. (2,640 to 5,280 ft.) from the eastern boundary of NWSTF Boardman, and adjacent agricultural lands. Additionally, the nearest populated areas are more than 2.3 mi. (12,100 ft.) from the proposed UAS facility, and over 4 mi. (21,120 ft.) north of the proposed MPMGR, DMPTR, and CLFR locations. Construction of these ranges and facilities would be a temporary source of local daytime sound. Given the distance from all construction locations to the NWSTF Boardman boundary, it is unlikely that sound levels from construction activities would be audible above background noise levels at any sensitive receptor; therefore, no sensitive receptors would be exposed to noise from construction activities under Alternative 1.

Table 3.4-9: Noise Levels of Equipment Anticipated for Construction Use

Equipment	Typical Noise Level (dBA) 50 feet from source	Approximate Noise Level (dBA) 0.5 mile from the source
Air Compressor	81	47
Backhoe	80	46
Compactor	82	48
Concrete Mixer	85	51
Dozer	85	51
Excavator	81	47
Generator	81	47
Grader	85	51
Jack Hammer	88	54
Loader	85	51
Paver	89	55
Pneumatic Tools	85	51
Roller	74	40
Saw	76	42
Scraper	89	55
Shovel	82	48
Torch/Welder	83	49
Truck	88	54

Note: dBA = decibels, A-weighted
Source: U.S. Department of Transportation 2006.

3.4.3.2.3 Training Noise

As described in Section 2.4 (Alternative 1 – Increase Training Activities, Accommodate Force Structure Changes, and Implement Required Range Enhancements), Alternative 1 would include all current training and testing activities described under the No Action Alternative, an increase in existing training activities, new training activities, and range enhancements to meet Navy and ORNG training requirements. Some ongoing training activities would increase as a result of force structure changes associated with the introduction of new aircraft or other equipment.

<u>Aircraft Noise</u>

Under Alternative 1, the total number of aircraft sorties (fixed-wing, helicopter, and UAS) would almost double from the No Action Alternative (see Table 2-4; from 1,815 to 3,423). The total flight time would also increase under Alternative 1, from 5,255 hours to 9,748 hours. One reason for this seemingly high number is because more than one aircraft may be in the airspace at one time, therefore there may be multiple flight hours during one real hour. Also, for estimation purposes within this EIS, sorties that occur for any portion of an hour of flight time are counted as a full hour. The majority of these activities are represented by EA-18G Growler (39 percent of all sorties) and ScanEagle UAV (43 percent of all sorties) (see Table 2-4). Approximately 85 percent of the 5,900 UAS flight hours are at or above 3,000 ft. (914.4 m). Based on noise levels from the Shadow UAV as presented under the No Action Alternative, once the ScanEagle UAV reaches approximately 3,000 ft. (914.4 m) AGL, the noise would not be heard on the ground. Additionally, typical flight paths for LATT (which would be typically performed by EA-18G Growler under Alternative 1) would change their orientation as a result of the addition of SUA (Boardman Low MOA and Boardman MOA [Proposed Expansion]) (Figure 3.4-13). Only LATT activities are currently scheduled to utilize this MOA, all other aircraft activities would continue to be limited to the existing SUA designated for NWSTF Boardman. As presented in Table A-2 of the noise study (Appendix E), less than 10 percent of all LATT activities would occur at elevations less than 500 ft. (152.4 m) AGL. None of the aircraft are flown at elevations less than 200 ft. AGL. Therefore, less than 135 LATT sorties would occur at elevations between 200 and 499 ft. (61 and 152.1 m) AGL annually.

Alternative 1 also introduces the use of the F-35C during Air and Strike Warfare Training Activities. As presented in Table 3.4-10, at a distance of 1,000 ft. (304.8 m) and at military power (the maximum power of the engine without using afterburners), the received SEL was reported as 115 dBA. At 5,000 ft. (1,524 m), the reported received SEL was 98 dBA; at 10,000 ft. (3,048 m), the received SEL was reported as 90 dB. Therefore, individuals underneath the flight paths of these activities would be exposed to aircraft noise as the aircraft passed overhead. However, the length of the exposure is anticipated to be short as the amount of time the noise source is over a sensitive receptor is extremely brief.

Similar to the No Action Alternative, the largest proportion of sensitive receptors is within the City of Boardman. As indicated in Figure 3.4-12, there are three schools and one library that underlie the NWSTF Boardman SUA (all within the City of Boardman); Sam Boardman Elementary School, Windy River Elementary School, Riverside Junior/Senior High School; and the Boardman City Library. It is important to note that the City of Boardman lies underneath Restricted Area 5706, which has a minimum altitude restriction of 3,500 ft. (0.66 mi.) AGL. The short-duration pass-bys of military aircraft over public areas lying under the restricted airspace (e.g., City of Boardman, sensitive receptors, recreational areas) would constitute discrete noise events that, while noticeable because they would exceed the background noise level, would contribute very little to the hourly average sound level.

Figure 3.4-14 shows the DNL levels based on the number of aircraft activities listed under Table 2-4 for Alternative 1. Figure 3.4-15 shows the change in dB between the No Action Alternative and Alternative 1 for areas that have a DNL above 65 dBA. Figure 3.4-16 shows the DNL levels over the City of Boardman based on the number of aircraft activities listed under Table 2-4 for Alternative 1.

Alternative 1 also introduces the use of the F-35C during Air and Strike Warfare Training Activities (Table 2-4; 64 annual sorties). As presented in Table 3.4-10, at a distance of 1,000 ft. (304.8 m) and at military power (the maximum power of the engine without using afterburners), the received SEL was reported as 115 dBA. At 5,000 ft. (1,524 m), the reported received SEL was 98 dBA, and at 10,000 ft. (3,048 m), the received SEL was reported as 90 dB.

Alternative 1 also introduces the use of additional fixed-wing and helicopter use. The estimated average SEL of single aircraft overflights at various distances (dBA) from the aircraft proposed for use (in addition to those used under the No Action Alternative) are presented in Table 3.4-10. While single overflight events constitute discrete intrusive noise events which may cause temporary distraction or annoyance, their contribution to the overall hourly noise levels would be low. Noise modeling was performed for all aircraft activities utilized under Alternative 1 at NWSTF Boardman. Figure 3.4-14 shows the DNL levels based on the number of aircraft activities listed under Table 2-4 for Alternative 1.

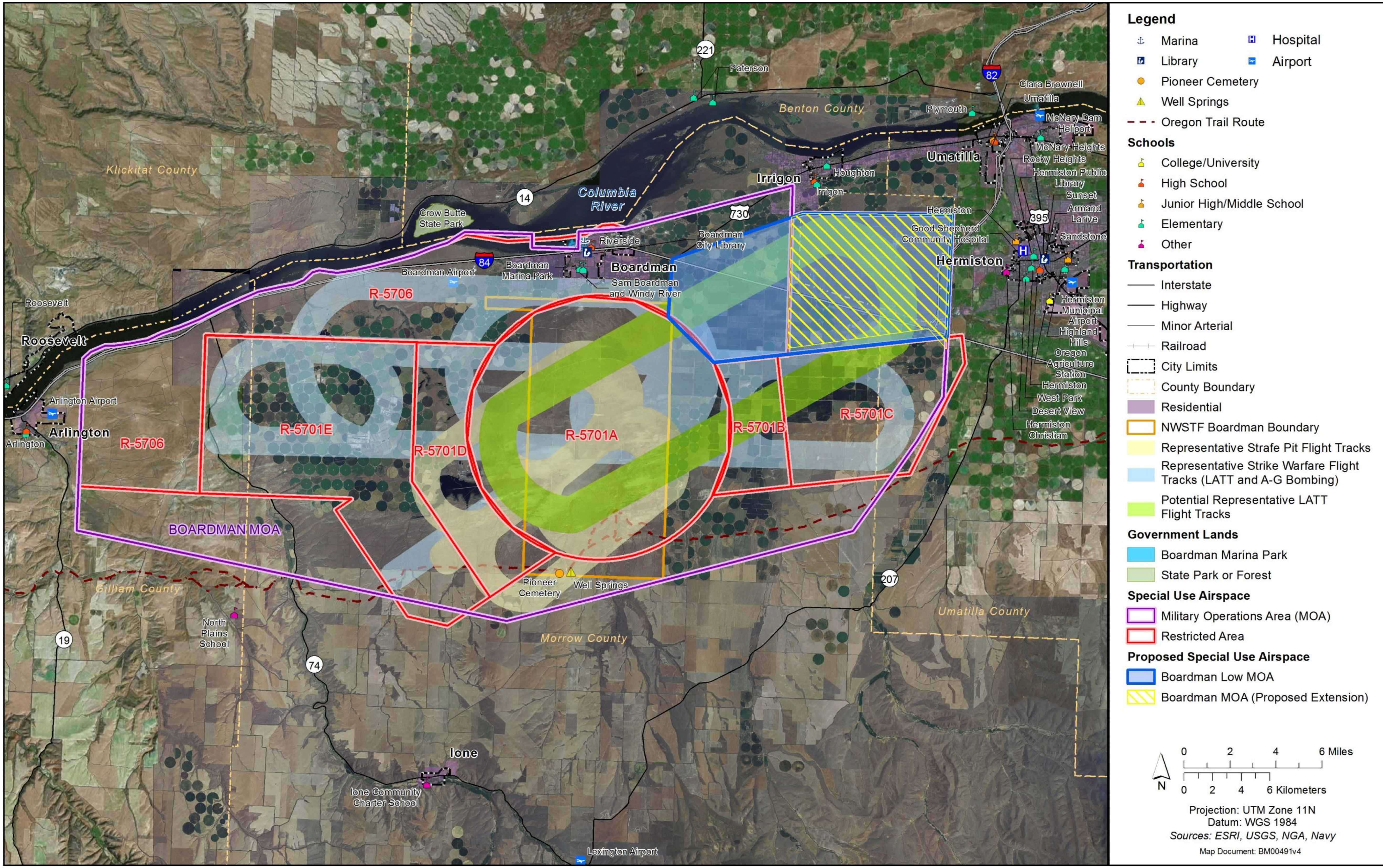

Figure 3.4-13: Aircraft Flight Tracks under Alternatives 1 and 2 (Representative)

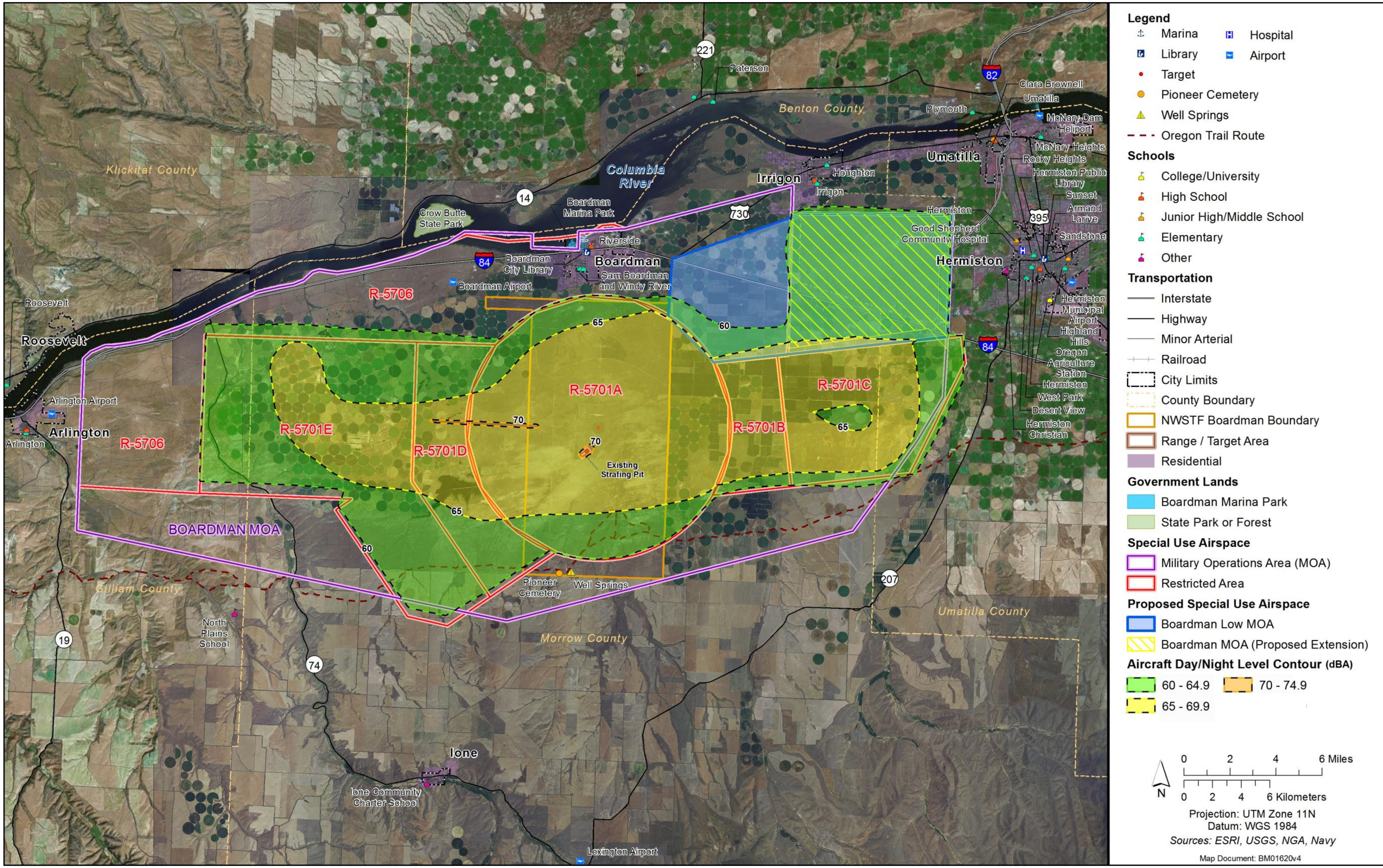

Figure 3.4-14: Aircraft Day-Night Level Contours (Alternative 1 and 2)

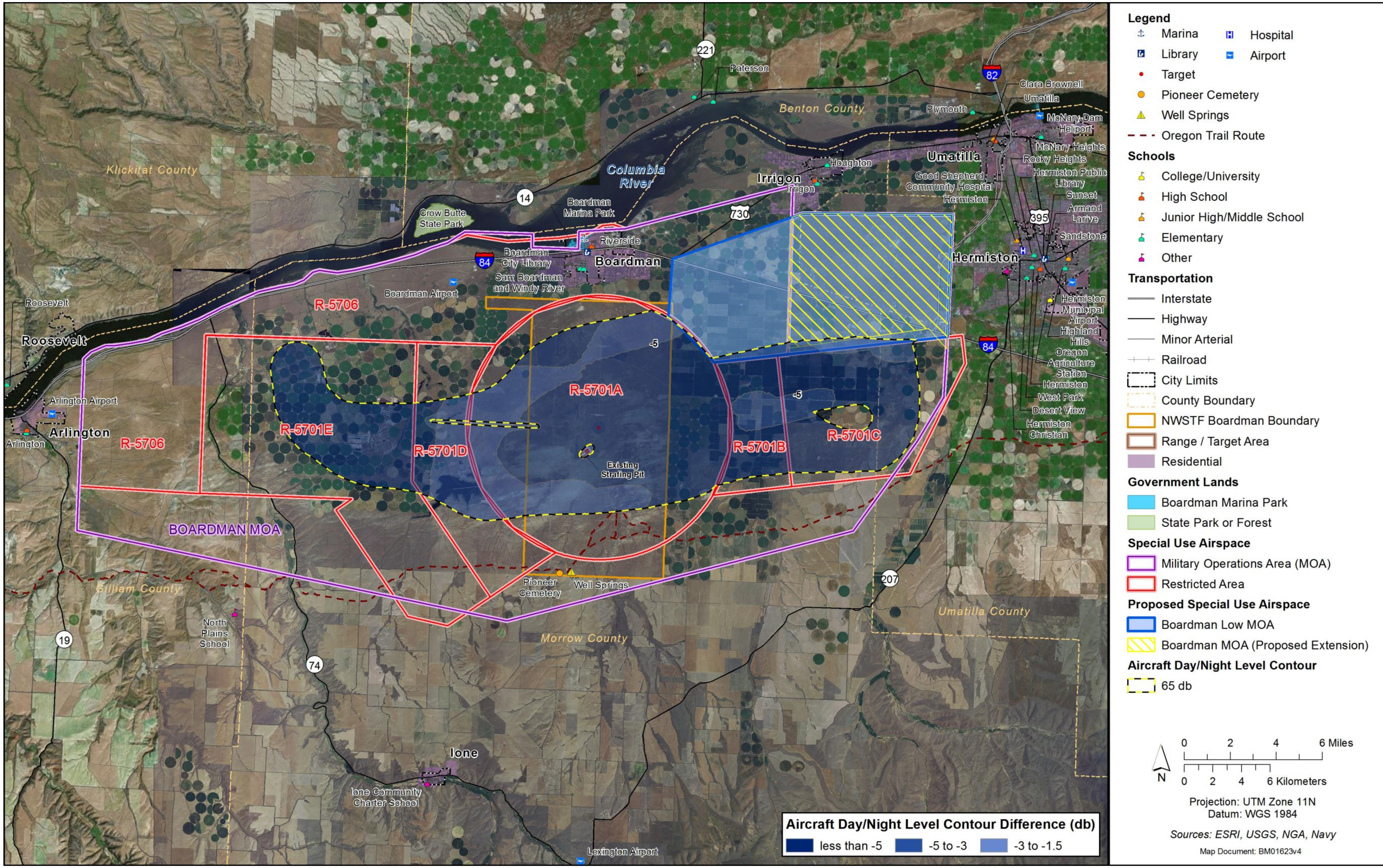

Figure 3.4-15: Aircraft Day-Night Level (DNL) Difference Contours for Areas with DNL Greater than 65 dBA (Alternative 1 and 2)

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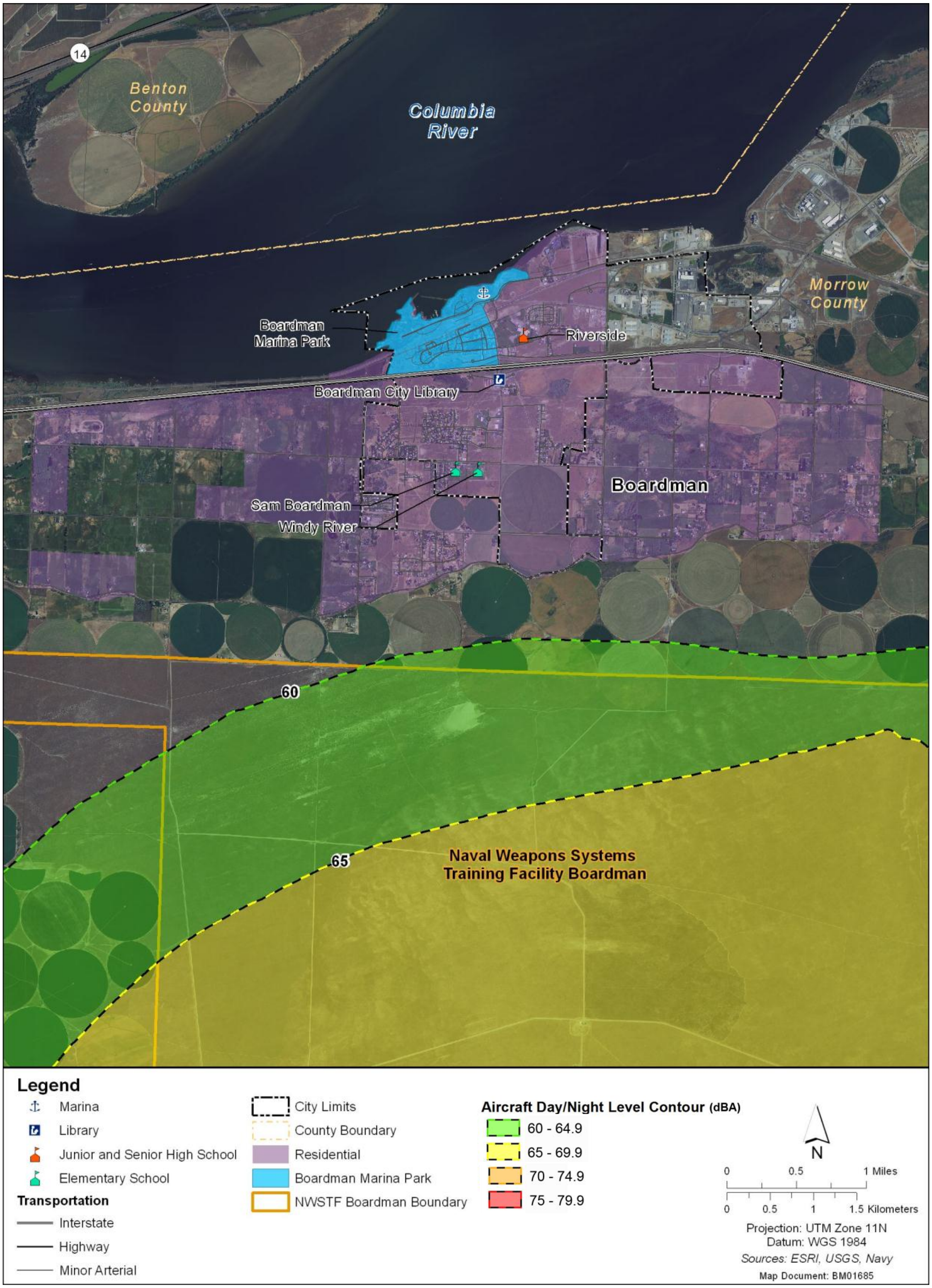

Figure 3.4-16: Aircraft Day-Night Level (DNL) Contours (Alternative 1 and 2) over the City of Boardman

Table 3.4-10: Estimated A-Weighted Sound Exposure Level of Single Aircraft Overflights (dBA)

Aircraft Type	Modeled Average Speed (KIAS)	Modeled Average Power Setting	Altitude (feet AGL)									
			200		500		1,000		5,000		10,000	
			SEL	L_{max}	SEL	L_{max}	SEL	L_{max}	SEL	L_{max}	SEL	L_{max}
Fixed-Wing												
F-15E	400	*90% NC*	123	120	116	111	111	104	96	85	85	75
F-16C	400	*90% NC*	120	120	113	111	108	103	92	84	84	73
EA-18G*	400	*90% NC*	121	124	116	115	112	108	98	88	90	76
AV-8B	400	*90% RPM*	112	114	105	104	99	96	80	73	70	62
P-3/EP-3	300	*3500 ESHP*	101	101	94	92	90	85	76	68	70	60
P-8	300	*20,000 lb.*	103	102	97	94	93	88	82	73	75	64
MC-130E/H	300	*16,000 in.-lb.*	100	100	94	91	89	85	75	66	67	57
C-17	300	*1.25 EPR*	109	108	101	98	94	89	76	66	68	57
C-23	300	*90% RPM*	86	87	80	79	76	73	64	57	58	49
F-35	400	*90% ETR*	129	130	122	121	115	113	98	92	90	82
P-3/EP-3	300	*3500 ESHP*	101	101	94	92	90	85	76	68	70	60
P-8	300	*20,000 lb.*	103	102	97	94	93	88	82	73	75	64
Helicopters												
CH-47	120	*n/a*	104	102	100	94	97	87	87	71	81	63
UH-60	120	*n/a*	95	93	90	84	87	78	75	60	68	50

* The EA-18G Growler is an electronic combat version of the FA-18 E/F that will replace the EA-6B Prowler. Noise measurements show that Growler noise levels are similar to those of the Prowler. Noise levels will vary depending on where you are in the flight pattern. The Growler is recognizable by the low-frequency "rumble" of its jet engines, while the Prowler is associated with a higher frequency sound of its jet engines (Appendix E, Noise Report, contains the full details on overflight noise levels).

Notes. (1) SEL and L_{max} values generated by Wyle Laboratories. P-3/EP-3, P-8, and C-23 estimated from NOISEMAP OPX A-weighted values adjusted to un-weighted for similar aircraft types. P-8 modeled as civilian equivalent, B737-700. MC-130E/H modeled as C-130H&N&P. F-35 utilizes F-35A noise data (data for other variants not available). (2) AGL = Above Ground Level, SEL = Sound Exposure Level, L_{max} = Maximum unweighted sound level (decibels), RPM = Revolutions Per Minute, NC = Engine Core RPM, ESHP = Equivalent Shaft Horsepower, lb. = pounds, in.-lb. = inch-pounds, EPR = Engine Power Ration, ETR = Engine Thrust Request, n/a = not applicable

Sound levels up to 65 dBA are considered to be compatible with land uses such as residences, transient lodging, and medical facilities. While the lands underneath the newly established MOA will experience elevated DNL levels, which would represent a degradation of the noise environment, modeling indicates that even during busy months, the c DNL remains below 65 dBA. As displayed in Figure 3.4-14, under Alternative 1, lands that are underneath Restricted Area R5701 (A through E) have a DNL greater than 65 dBA (approximately 161.4 mi.^{2}). This represents an almost 42 percent decrease from the No Action Alternative, where approximately 287.1 mi.^{2} (418 km^2) of lands outside of NWSTF Boardman had a similar DNL. This is a result of the redistribution of LATT flight tracks, which utilize the new MOAs as well as existing airspace, effectively reducing the contribution to the noise environment at any one point.

Further, under Alternative 1, the EA-6B Prowler, which was a significant contributor to the noise environment under the No Action Alternative, is no longer used. Additionally, the City of Boardman lies outside of the 60 dBA DNL contour and thus that land would fall into Noise Zone I (see Figure 3.4-16).

A very small portion of the area outside of the NWSTF Boardman boundary (0.94 mi^2 [2.4 km^2]) has a DNL between 70 and 75 dBA (Noise Zone II) under Alternative 1. This is a reduction in area from approximately 172.4 mi.^{2} (446.4 km^2) that were between 70 and 75 dBA under the No Action Alternative, which is also a result from the redistribution of LATT flight tracks and no EA-6B Prowler usage. There are no sensitive receptors (e.g., residences, schools, hospitals) located in this area. The land use categories defined by Federal Regulation Part 150 as not being compatible with these sound levels include residences, mobile home parks, transient lodging, schools, and hospitals and churches (14 C.F.R. Part 150; Table 1). Under Alternative 1, there are no areas with DNLs greater than 75 dBA. Visual inspection of aerial maps of the areas within regions where the DNL is in excess of 65 dBA reveals that the majority of the area is utilized for agricultural purposes, which is a compatible land use in Noise Zone II. However, several structures were identified, most notably on lands underneath Restricted Areas R5701C and R5701E. At these specific locations (15 private residences within agricultural areas, as compared to 47 under the No Action Alternative), during busy months of training activities at NWSTF Boardman, noise would interfere with normal activities associated with their use; however, these interferences would be less than those experienced under the No Action Alternative, and noise from aircraft activities under Alternative 1 would not represent significant degradation in the noise environment.

Table 3.4-11: Population Underlying DNL Contours under Alternatives 1 and 2

Census Tract	Block Group	No Action Alternative Population Under Contour			Alternative 1 & 2 Population Under Contour			Percent Change from No Action Alternative		
		>65 dB	>70 dB	>75 dB	>65 dB	>70 dB	>75 dB	>65 dB	>70 dB	>75 dB
9505	BG 3	17	11	0	7	0	0	-57%	-100%	
9511	BG 1	232	102	0	117	0	0	-50%	-100%	
9601	BG 1	29	0	0	0	0	0	-100%		
9701	BG 5	1186	710	9	667	6	0	-44%	-99%	-100%
9702	BG 1	161	123	0	119	0	0	-26%	-100%	-100%
9702	BG 2	8	0	0	0	0	0	-100%		
TOTAL		**1,633**	**946**	**9**	**910**	**6**	**0**	**-44%**	**-99%**	**-100%**

As mentioned above, under Alternative 1, there would be a decrease in the area where the DNL exceeded 65 dBA, mostly as a result of the redistribution of LATT flight paths and lack of EA-6B Prowler flights. The contours for Alternative 1 were overlaid onto the contours for the No Action Alternative to calculate the "difference" in noise levels from the No Action Alternative to Alternative 1 from aircraft activities. While there are still lands outside the NWSTF Boardman boundary that lie within the 65dB contour, the "difference" map indicates that the noise levels decrease as a result of implementing Alternative 1 (see Figure 3.4-15 and Figure 3.4-16). Further, by comparing the estimated populations under each contour for Alternative 1 with those calculated for the No Action Alternative (Table 3.4-11), it is apparent that there are no increases in population impacted. All Tract/Block impacted population values decreased from the No Action Alternative. In total, the 65 dBA affected population decreased by approximately 44 percent, the 70 dBA affected population decreased by approximately 99 percent, and the 75 dBA affected population decreased by 100 percent. Given that no area would experience an increase of 1.5 dB into or within the 65 DNL, the implementation of the Alternative 1 would not result in a significant noise impact at NWSTF Boardman.

Range Noise

Small Arms Noise

Under Alternative 1, training activities would continue to include the use of non-explosive practice bombs as well as small- and medium-caliber rounds. As listed in Table 2-3, a total of approximately 1,701,800 small- and medium-caliber rounds would be fired at NWSTF Boardman, though distributed between the main target area, MPMGR, DMPTR, and eastern CLFR. Modeling was performed for small arms usage at both the DMPTR and the MPMGR. The combined noise contours for land use compatibility for small arms firing activity at the DMPTR and the MPMGR are illustrated in Figure 3.4-17.

As explained previously in this document, Noise Zone I includes all areas in which the PK-15 is less than 87 dB and is suitable for all types of land uses. Noise Zone II includes all areas in which the PK-15 is between 87 and 104 dB, and allowable land uses include manufacturing, warehousing, and transportation. Residential development in this zone is not normally recommended. Noise Zone III includes all areas in which the PK-15 is above 104 dB. Noise-sensitive land uses, such as housing, schools, churches, and medical facilities, are not recommended within this zone.

For activities at the DMPTR, the Zone II noise contour extends 4,921.3 ft. (1,500 m) east of the NWSTF Boundary. For activities at the MPMGR, the Zone II noise contour extends 8,858.3 ft. (2,700 m) west beyond the NWSTF Boardman boundary line. The primary land use in these areas is agricultural and livestock farming within the immediate vicinity of the NWSTF Boardman boundary, with a multi-species conservation area immediately west of the facility. Visual inspection of aerial maps of the areas within Noise Zone II reveals no residences or other sensitive receptors. Because noise-generating events from range activities would be intermittent and occur in areas removed from sensitive receptors, sensitive receptors would not likely be exposed to high noise levels from range firing activities under Alternative 1. Thus, range activities under Alternative 1 do not represent a significant degradation in the noise environment.

Impulse and Large Arms Noise

Under Alternative 1, training activities would continue to include the use of non-explosive practice bombs. A total of 427 non-explosive practice bombs would be dropped annually in the main target area. Alternative 1 would also introduce the use of 120mm tank rounds (700 rounds to be utilized at the DMPTR), Tube-Launched, Optically Tracked, Wire Guided (TOW) missiles (35 to be utilized at the DMPTR), and high explosive charges (50 events using Net Explosive Weights [NEW] ranging between 25 and 200 pounds [lb.] [11.3 and 90.7 kilograms {kg}] utilized at the DTR site). Munitions used yearly at the NWSTF Boardman DTR includes two 200 lb. (90.7 kg) shots, five 100 lb. (45.4 kg) shots, ten 50 lb. (22.7 kg) shots, twenty 25 lb. (11.3 kg) shots, and the remaining thirteen shots are under 25 lb. (11.3 kg). The daily maximum NEW is not to exceed 200 lb. (90.7 kg). Estimated noise levels in Table 3.4-12 depict average SEL noise levels at various distances in the direction of fire from a single event.

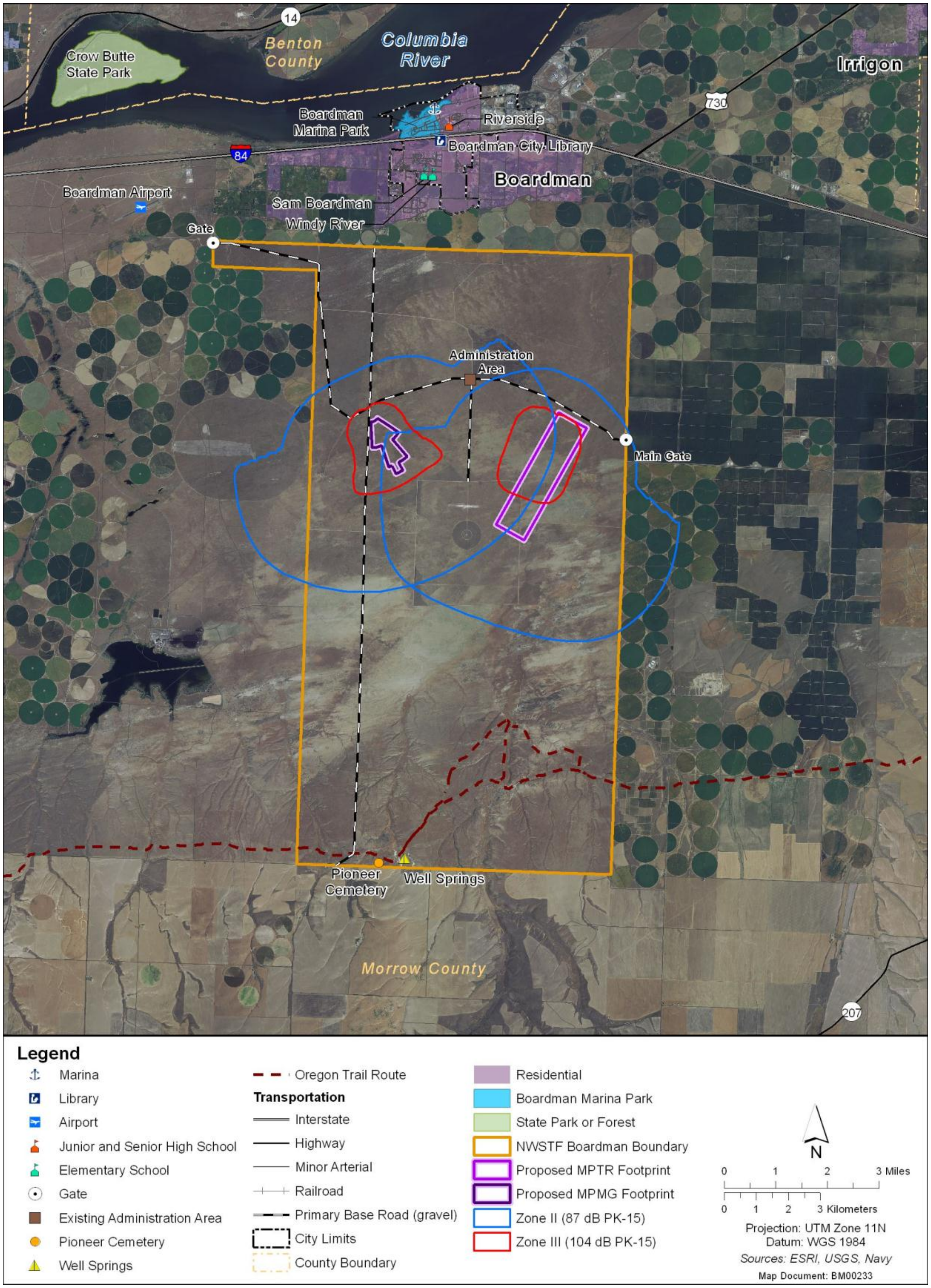

Figure 3.4-17: Proposed MPMGR and DMPTR Small-Caliber Noise Contours under Alternative 1

Table 3.4-12: Estimated Sound Exposure Level at Various Distances Generated by Weapons Firing or Detonations

Munition Type	Distance from Source (feet)							
	50	100	250	500	1,000	2,000	5,280	10,560
120 mm Tank Round	142	136.0	128.0	122.0	116.0	110.0	101.5	95.5
100 lb. NEW, Explosive	149	143.0	135.0	129.0	123.0	117.0	108.5	102.5
200 lb. NEW, Explosive	149.7	143.7	135.7	129.7	123.7	117.7	109.2	103.2

Notes: (1) mm = millimeter, NEW = Net Explosive Weight, lb. = pounds. (2) Sound Exposure Level values estimated at various distances using the U.S. Army Corps of Engineers Large Arms Noise Assessment Model (BNOISE).

Using the data described in Chapter 2 (Description of Proposed Action and Alternatives) and above, BNOISE2 was used to calculate and plot the 62 and 70 dB CDNL contours (the day-noise level for a typical training day, Figure 3.4-18) for munitions activities associated with the main target area (MK-76 and MK-80 Series bombs, laser-guided training rounds, the strafe pit (20 mm) and DTR (25–200 lb. [11.3 to –90.7 kg] NEW detonations). The training activities involving the use of munitions generate noise levels between 62 dB and 70 dB. The 62 dB CDNL contour would surround the Main Target Area, strafe pit, and the DTR site. None of the CDNL contours extend beyond the Boardman range boundary. Activities at these locations would not affect surrounding areas or sensitive receptors because the 62 dB contour does not extend beyond the range boundary.

To determine the potential for noise complaint risk from people in the surrounding area, PK-15 contours were calculated and plotted in Figure 3.4-18. Under Alternative 1, the area with a high risk of noise complaints is confined within the Range boundary. Areas with a medium risk of noise complaints would exist beyond the NWSTF Boardman boundary and would extend up to 5 mi. off the Range boundary primarily to the east and west in areas that are primarily agricultural. Following visual review of aerial maps, several residences within these agricultural areas were identified. Additionally, in the areas to the north of NWSTF Boardman, many residences are within the medium risk of noise complaint area, most notably within the City of Boardman. It is important to note that the PK-15 contours are generated from single events. The largest area of impact would be from the 200 lb. (90.7 kg) NEW detonations at the DTR site. However, of the 50 DTR events planned per year, the detonation of 200 lb. (90.7 kg) NEW only occurs twice a year. The majority (67 percent) of detonations are 25 lb. (11.3 kg) NEW or less, which have an area of high and medium risk of noise complaints approximately two-thirds the area of the 200 lb. (90.7 kg) NEW detonation.

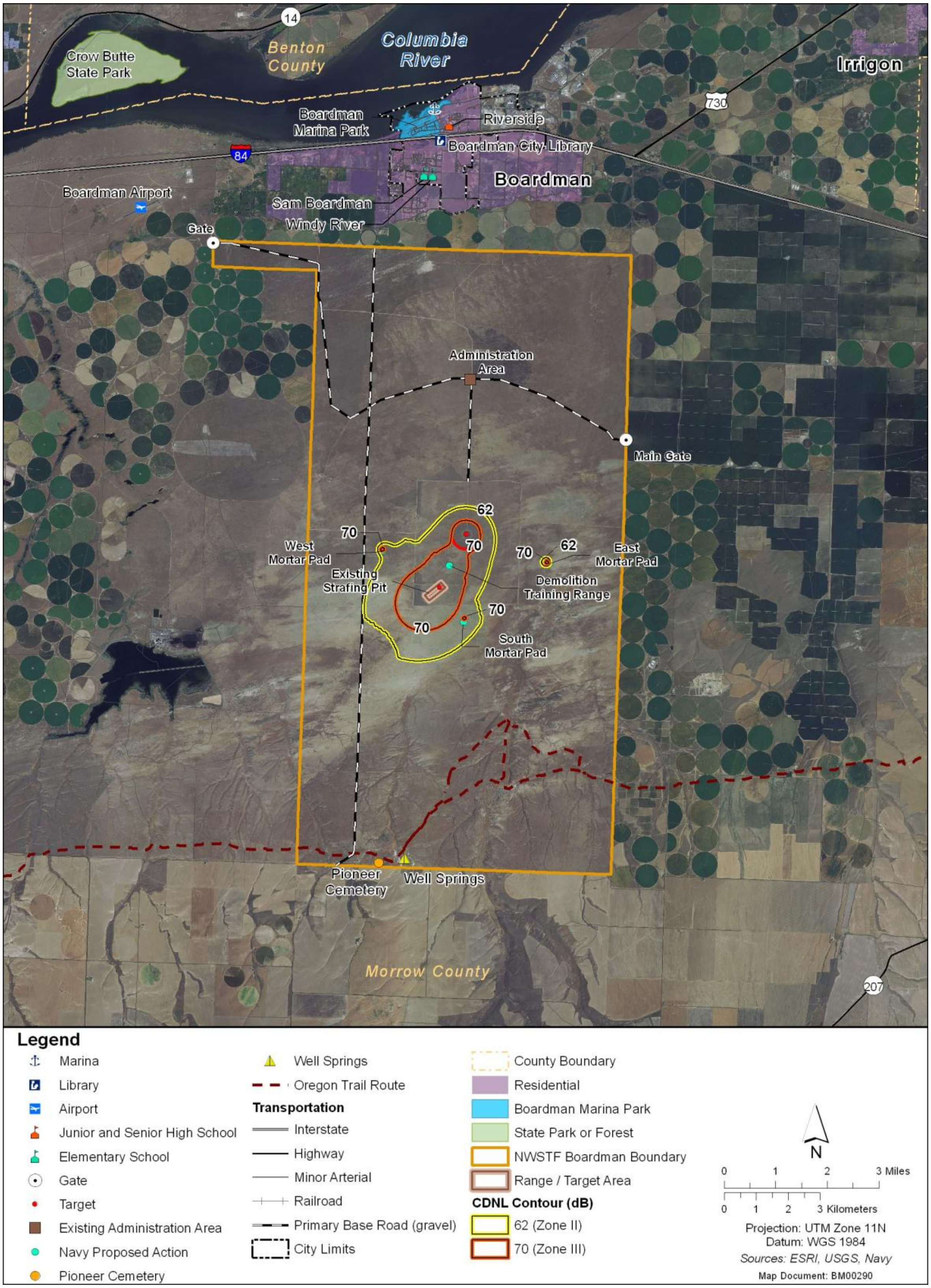

Figure 3.4-18: CDNL Contours for Munitions Activities Associated with the Main Target Area, Strafe Pit, and DTR under Alternative 1

Modeling was also performed for large arms at the DMPTR. Figure 3.4-20 illustrates the combined noise contours for land use compatibility for large-caliber firing activity from a variety of firing points within the DMPTR. As discussed earlier, Noise Zone I for impulse or large arms noise includes all areas in which the CDNL is below 62 dBC, Noise Zone II includes all areas in which the CDNL is between 62 and 70 dBC, and Noise Zone III includes all areas in which the CDNL is above 70 dBC. The 70 dB noise contour does not extend off the NWSTF Boardman property. The 62 dB noise contour extends approximately 2,690.3 ft. (820 m) east beyond the NWSTF Boardman boundary line. The primary land use in this region is agricultural and livestock farming. These are compatible land uses within Noise Zone II as there are no sensitive receptors anticipated within these areas.

To determine the potential for noise complaint risk from people in the surrounding area from large arms use at the DMPTR, PK-15 contours were calculated and plotted in Figure 3.4-21. Under Alternative 1, the area with a high risk of noise complaints is confined within the NWSTF Boardman boundary. Areas with a medium risk of noise complaints extend into an agricultural area east of the NWSTF Boardman boundary. However, following review of aerial maps of the area within the medium noise risk complaint area, there were no sensitive receptors identified within this area that would be impacted by noise from the DMPTR.

3.4.3.2.4 Summary

Overall, military training activities on NWSTF Boardman under Alternative 1 include several sources of noise that could be audible in adjacent agricultural and open space areas surrounding NWSTF Boardman. Major sources of noise include helicopters and fixed-wing aircraft involved in air warfare, electronic combat, strike warfare, and insertion/extraction training activities, as well as impulsive events associated with live-fire activities. Portions of lands to the west of NWSTF Boardman (conservation lands and agricultural lands) and east (agricultural lands) have a DNL between 60 and 70 dBA as a result of military training activities. A very small portion of the area outside of the NWSTF Boardman boundary (0.94 mi^2 [2.4 km^2]) has a DNL between 70 and 75 dBA under Alternative 1. This is a reduction in area from approximately 172.4 $mi.^2$ (446.4 km^2) that were between 70 and 75 dBA under the No Action Alternative. Under Alternative 1, there would be a decrease in the area where the DNL exceeds 65 dBA. Additionally, while the lands underneath the newly established MOA would experience a long-term increase in noise levels, the average DNL during a busy month of aviation activities would remain below 65 dBA. Noise levels up to 65 dBA are compatible with land uses such as residences, transient lodging, and medical facilities. However, there are no sensitive receptors under 70–75 DNL contours.

Impacts to noise levels from training activities under Alternative 1 can occur on lands outside of the Target Areas, but they are partially reduced by the training schedule. Aircraft training activities on NWSTF Boardman occur primarily during the day, whereas individuals are most sensitive to noise at night. The areas surrounding NWSTF Boardman are primarily agricultural and, thus, very few members of the public are exposed to noise from training activities on NWSTF Boardman (at the few locations [15] where private residences are located amongst the agricultural parcels). Given the above analysis, the total noise impacts of the increased vehicle noise, construction, and arms noise would not change the 65 DNL contour, as shown in Figure 3.4-14. As shown in Figure 3.4-15, these contours represent a reduction in noise levels in comparison to the No Action Alternative. Therefore, the implementation of Alternative 1 would not result in a significant noise impact.

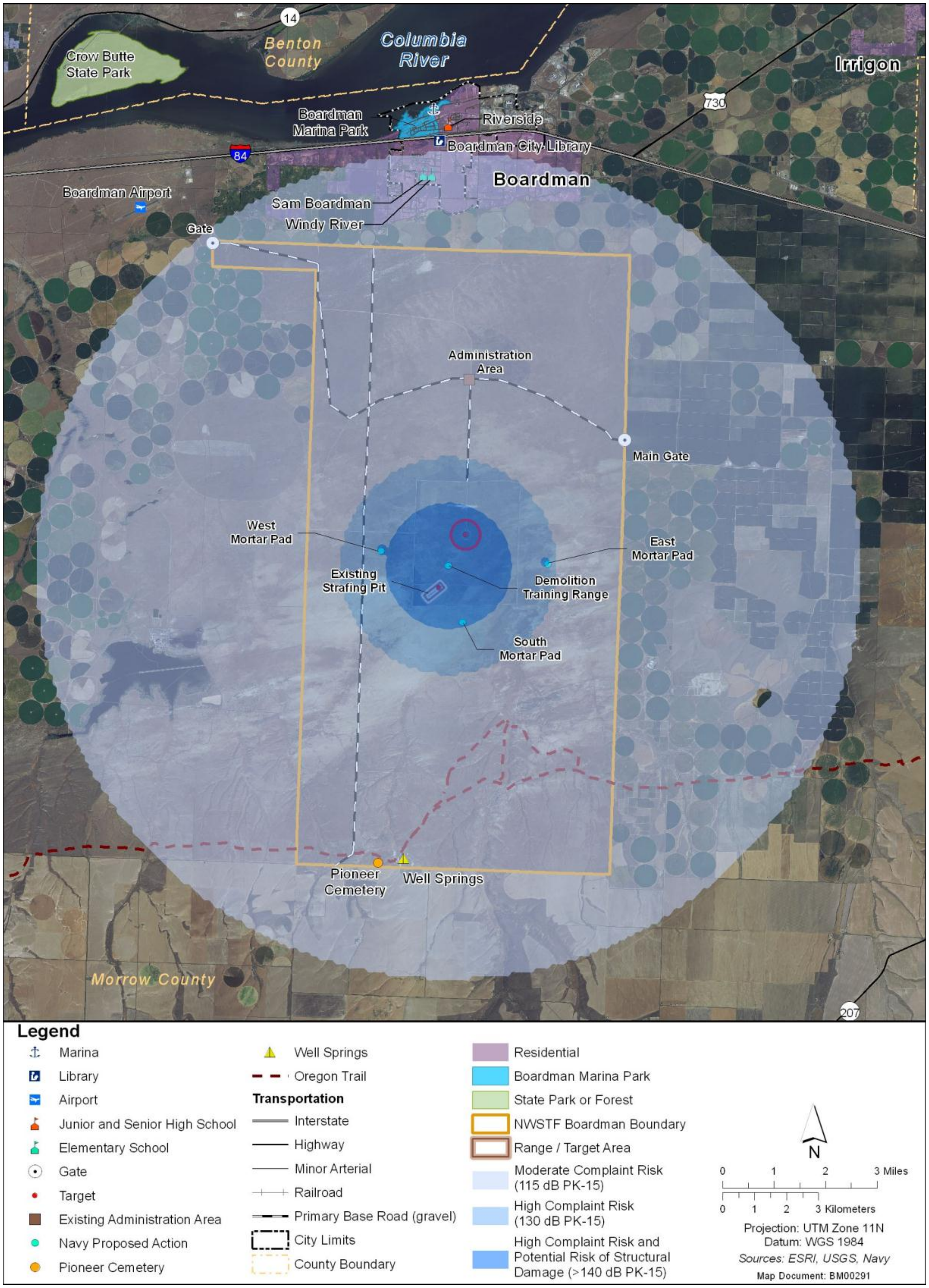

Figure 3.4-19: Projected Complaint Risk Areas for Munitions Activities Associated with the Main Target Area, Strafe Pit, and DTR under Alternative 1

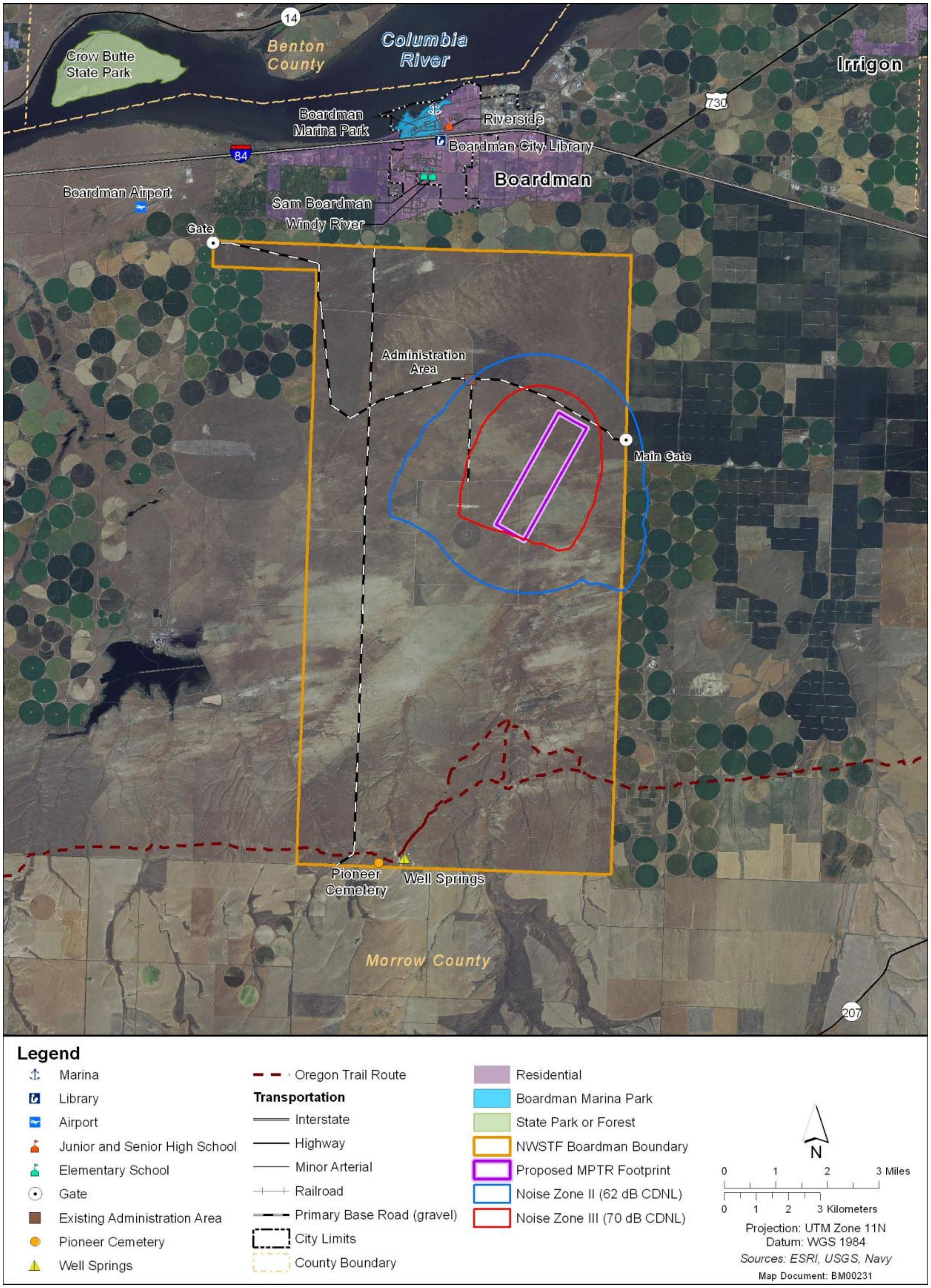

Figure 3.4-20: Projected Large-Caliber Noise Contours under Alternative 1

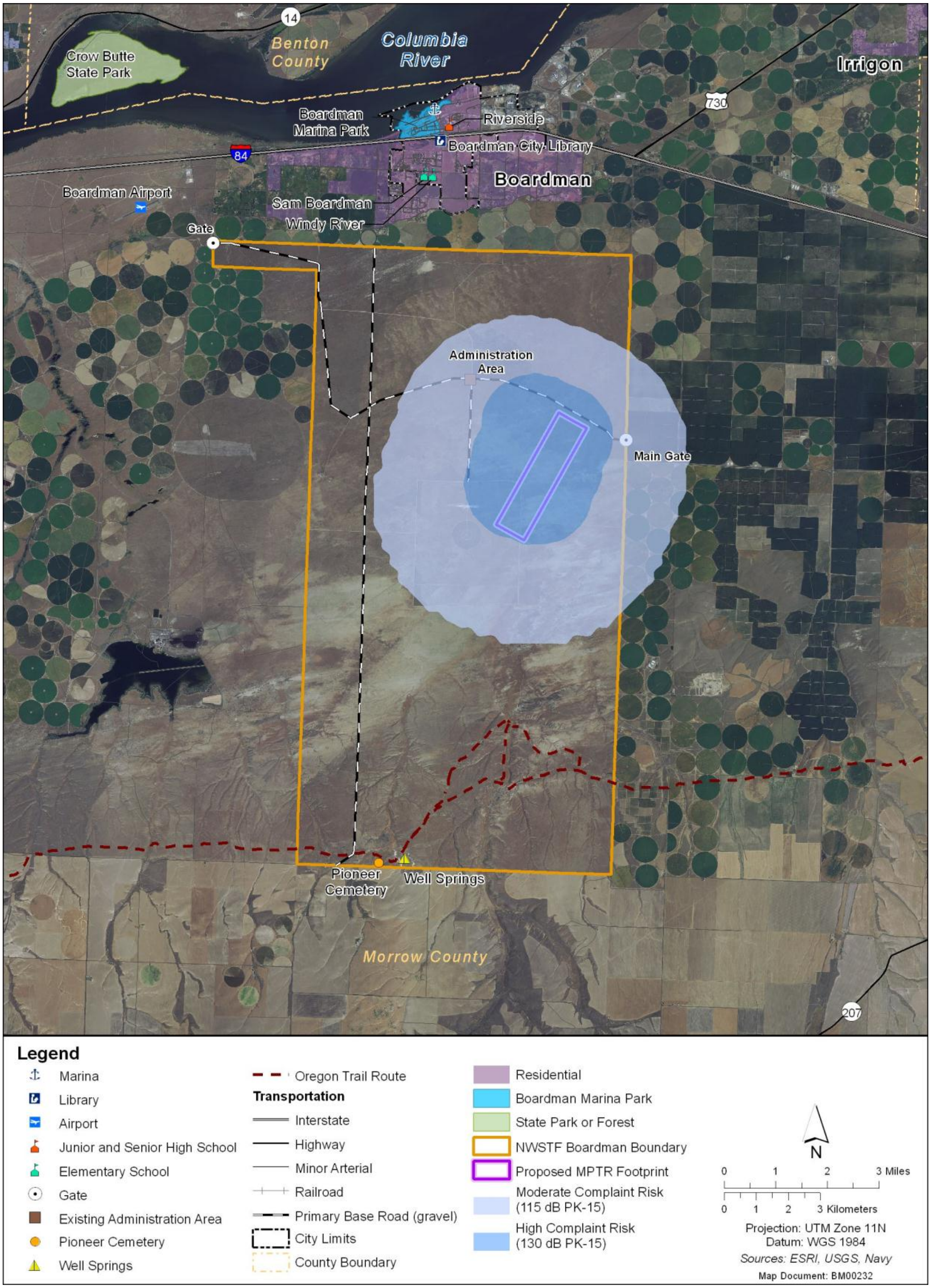

Figure 3.4-21: Projected Large-Caliber Complaint Risk Areas under Alternative 1

3.4.3.3 Alternative 2

3.4.3.3.1 Vehicle Noise

Under Alternative 2, additional ground-based training would occur at NWSTF Boardman in comparison to the No Action Alternative (see Table 2-1) with the exception of the DMPTR and ROCA, which are not proposed under Alternative 2. In support of this training, personnel and equipment would be transported from UCD prior to the start of training activities and would be transported back to Umatilla following completion of training. Vehicles used for transporting personnel and equipment would include vans, buses, and semi-tractor trucks. Future traffic volume increases on Interstate 84 associated with training on NWSTF Boardman, the only high-volume, high-speed road in the area, would be insufficient to noticeably affect noise levels in the areas surrounding NWSTF Boardman. Increases in vehicle traffic on other local roads likewise would have no substantial effect on noise levels. Military traffic on local roads would be a minor portion of this traffic. Thus, project-related traffic noise would not substantially affect the noise environment under Alternative 2.

3.4.3.3.2 Construction Noise

Under Alternative 2, several range enhancements are proposed which include construction activities. These include the enhancements listed in Alternative 1 (MPMGR and ROCA, CLFR, DTR, and UAS Training and Maintenance Facility) (see Figure 2-2) with the exception of the DMPTR and ROCA, which are not proposed under Alternative 2. Additionally, Alternative 2 proposes the construction of a second (western) CLFR and the construction of a joint use Administration Building (see Figure 2-3). Construction of these ranges and facilities would be a temporary source of local daytime noise. As described in Section 2.4.4 (Required Range Enhancements), all construction and grading would be completed utilizing typical construction equipment.

The nearest populated areas are more than 2.3 mi. (12,100 ft.) from the proposed UAS facility, and over 4 mi. (21,120 ft.) north of the proposed MPMGR and CLFR locations. Typical noise levels of commonly used construction equipment are presented in Table 3.4-7. Given the distance from all construction locations to the NWSTF Boardman boundary, it is unlikely that noise levels from construction activities would be audible above typical background noise levels at any sensitive receptor.

3.4.3.3.3 Training Noise

As described in Section 2.4 (Alternative 1 – Increase Training Activities, Accommodate Force Structure Changes, and Implement Required Range Enhancements), Alternative 2 would include all current training and testing activities described under the No Action Alternative, an increase in existing training activities, new training activities, and range enhancements to meet Navy and ORNG training requirements. Some ongoing training activities would increase as a result of force structure changes associated with the introduction of new aircraft or other equipment.

Aircraft Noise

Similar to Alternative 1, under Alternative 2 the total number of aircraft sorties (fixed-wing, helicopter, and UAS) would increase (see Table 2-4) from 1,815 under the No Action Alternative to 3,423. The total flight time would also increase under Alternative 2 from 5,255 hours to 9,748 hours. The majority of all aircraft sorties are conducted by EA-18G Growler and ScanEagle. While the total number of sorties would increase, typical flight paths for LATT would change their orientation as a result of the addition of the northeast MOA (Boardman Low MOA and Boardman MOA [Proposed Expansion]) (see Figure 3.4-13). As presented in Table A-2 of the noise study (Appendix E), less than 10 percent of all LATT activities would occur at elevations less than 500 ft. (152.4 m) AGL. None of the manned fixed-wing aircraft are flown at elevations less than 200 ft. (60.1 m) AGL. Therefore, less than 135 LATT sorties would occur at elevations between 200 and 499 ft. (60.1 and 152.1 m) AGL annually.

Similar to Alternative 1, Alternative 2 introduces the use of the F-35C Joint Strike Fighter during Air and Strike Warfare Training Activities. As presented in Table 3.4-10, at a distance of 1,000 ft. (304.8 m) and at military power (the maximum power of the engine without using afterburners), the received SEL was reported as 115 dBA. At 5,000 ft. (1,524 m), the reported received SEL was 98 dBA and at 10,000 ft. (3,048 m), the received SEL was reported as 90 dB. Therefore, individuals underneath the flight paths of these activities would be exposed to aircraft noise as the aircraft passed overhead, however, the length of the exposure is anticipated to be short as the amount of time the noise source is over a sensitive receptor is extremely brief.

While single overflight events constitute discrete intrusive noise events which may cause temporary distraction or annoyance, their contribution to the overall hourly noise levels would be extremely low. Noise modeling was performed for all aircraft activities utilized under Alternative 2 at NWSTF Boardman. Figure 3.4-14 shows the DNL levels based on the number of aircraft activities listed under Table 2-4 for Alternative 2.

Sound levels up to 65 dBA are considered to be compatible with land uses such as residences, transient lodging, and medical facilities. While the lands underneath the newly established MOA will experience elevated DNL levels, which would represent a degradation of the noise environment, modeling indicates that even during busy months, the DNL remains below 65 dBA. As displayed in Figure 3.4-14, under Alternative 2, lands that are underneath Restricted Area R5701 (A through E) have a DNL greater than 65 dBA (approximately 161.4 mi.^{2} [418 km^2]). This represents an almost 42 percent decrease from the No Action Alternative, where approximately 287.1 mi.^{2} (743.6 km^2) of lands outside of NWSTF Boardman had a similar DNL. This is a result of the redistribution of LATT flight tracks, which utilize the new MOAs as well as existing airspace, effectively reducing the contribution to the noise environment at any one point. Further, under Alternative 2, the EA-6B Prowler, which was a significant contributor to the noise environment under the No Action Alternative, is no longer used. The City of Boardman lies outside of the 65 dBA DNL contour and thus the land would fall into Noise Zone I (see Figure 3.4-16).

A very small portion of this area (0.94 mi.^{2} [2.4 km^2]) has a DNL between 70 and 75 dBA (Noise Zone II) under Alternative 2. This is a reduction in area from approximately 172.4 mi.^{2} (446.5 km^2) that were between 70 and 75 dBA under the No Action Alternative, which is again a result from the redistribution of LATT flight tracks and no EA-6B Prowler usage. The land use categories defined by Federal Regulation Part 150 as not being compatible with these sound levels include residences, mobile home parks, transient lodging, schools, and hospitals and churches (14 C.F.R. Part 150, Table 1). However, there are no sensitive receptors under this DNL contour. Under Alternative 2, there are no areas with DNLs greater than 75 dBA.

Visual inspection of aerial maps of the areas within regions where the DNL is in excess of 65 dBA reveals that the majority of the area is utilized for agricultural purposes, which is a compatible land use in Noise Zone II. However, several structures were identified, most notably on lands underneath Restricted Areas R5701C and R5701E. At these specific locations (15 private residences within agricultural areas, as compared with 47 under the No Action Alternative), during busy months of training activities at NWSTF Boardman, noise would interfere with normal activities associated with its use; however, these interferences would be less than those experienced under the No Action Alternative, and noise from aircraft activities under Alternative 2 would not represent degradation in the noise environment at only those locations.

As mentioned above, under Alternative 2, there would be a decrease in the area where the DNL exceeded 65 dBA, mostly as a result of the redistribution of LATT flight paths and lack of EA-6B Prowler flights. The contours for Alternative 2 (which are the same as for Alternative 1) were overlaid onto the contours for the No Action Alternative to calculate the “difference” in noise levels from the No Action Alternative to Alternative 2 from aircraft activities. While there are still lands outside the NWSTF Boardman boundary that lie within the 65 dB contour, the “difference” map indicates that the noise levels decrease as a result of implementing Alternative 2 (see Figure 3.4-16). Further, by comparing the estimated populations under each contour for Alternative 2 with those calculated for the No Action Alternative (Table 3.4-11), it is apparent that there are no increases in population impacted. All Tract/Block population values decreased from the No Action Alternative. In total, the 65 dBA affected population decreased by approximately 44 percent, the 70 dBA affected population decreased by approximately 99 percent, and the 75 dBA affected population decreased by 100 percent. Given that no area would experience an increase of 1.5 dB into or within the 65 DNL, the implementation of the Alternative 2 would not result in a significant noise impact at NWSTF Boardman.

Range Noise

Small Arms Noise

Under Alternative 2, training activities would continue to include the use of small- and medium-caliber rounds. As listed in Table 2-3, approximately 823,800 small- and medium-caliber rounds would be fired at NWSTF Boardman, though distributed between the main target area, MPMGR, and both CLFRs.

Modeling was performed for small arms usage at the MPMGR. While the combined noise contours for land use compatibility for small arms firing activity at the DMPTR and the MPMGR are illustrated in Figure 3.4-22, only the contour associated with the MPMGR is applicable under Alternative 2. The contours represent a maximum small arms training scenario with all ranges actively firing. For activities at the MPMGR, the Zone II noise contour extends 8,858.3 ft. (2,700 m) west beyond the NWSTF Boardman boundary line. The primary land use in this area is a multi-species conservation area immediately west of the facility, where few residences are expected to occur. Inspection of aerial maps of the area within Noise Zone II reveals no residences or other sensitive receptors within the medium noise complaint risk area.

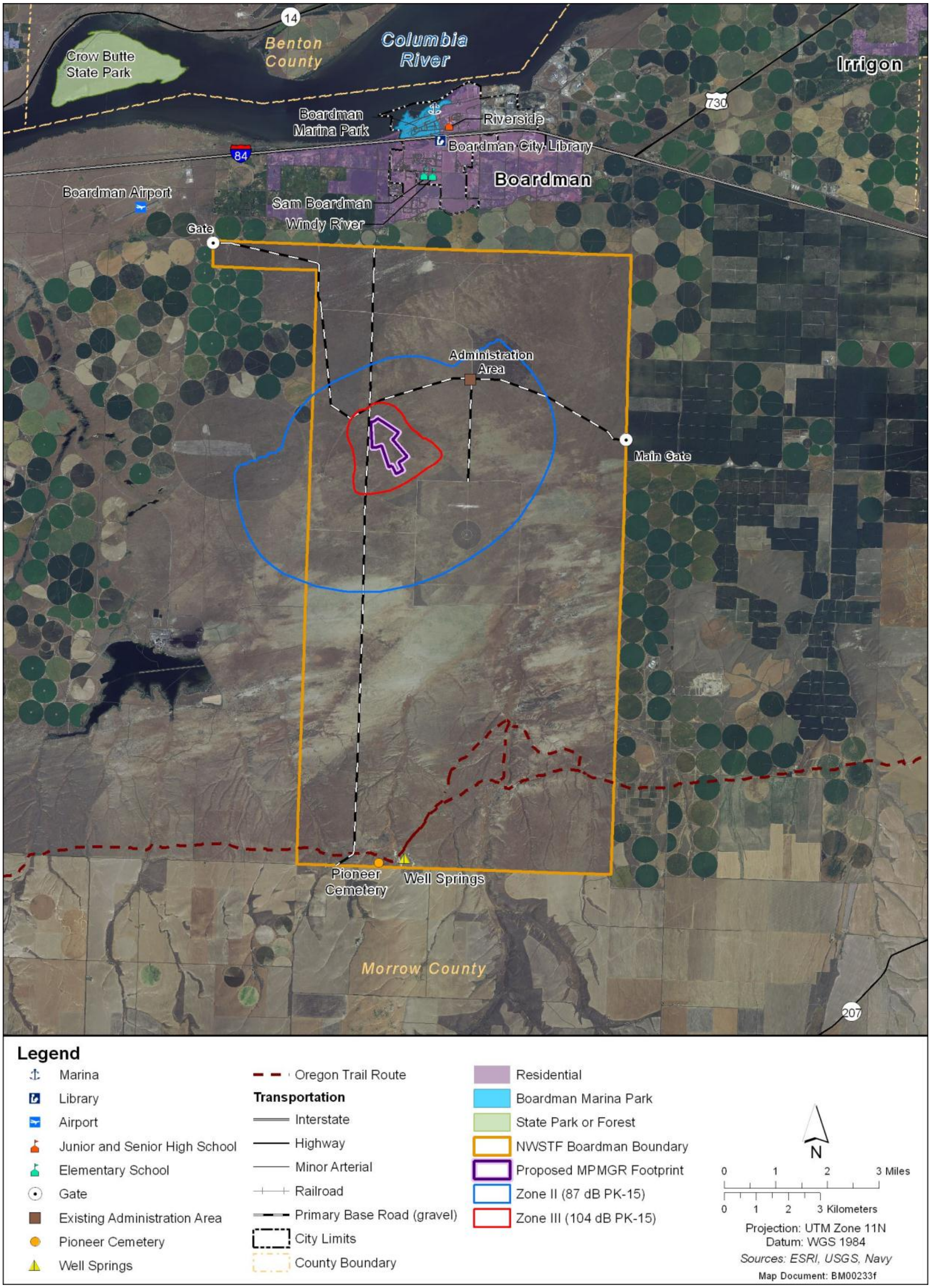

Figure 3.4-22: Proposed MPMGR Small-Caliber Noise Contours under Alternative 2

Impulse and Large Arms Noise

Under Alternative 2, training activities would continue to include the use of non-explosive practice bombs. A total of 427 non-explosive practice bombs would be dropped annually in the main target area. Alternative 2 would also introduce the use of M224 60 mm mortar rounds (1,440 rounds) to be used at the main target area, and high explosive charges (50, NEW ranging between 25 and 200 lb. [11.3 and 90.7 kg) utilized at the DTR. There are no sensitive receptors within 3.5 mi. (18,480 ft.) of the areas in which weapons are used. Under Alternative 2, training activities would not use 120 mm tank rounds or TOW missiles, since Alternative 2 does not propose the construction and operation of the DMPTR range.

Using the data described in Chapter 2 (Description of Proposed Action and Alternatives) and above, BNOISE2 was used to calculate and plot the 62 and 70 dB CDNL contours (the day-noise level for a typical training day) for munitions activities associated with the main target area (MK-76 and MK-80 Series bombs, Laser-guided training rounds, 60 mm mortar fire, the strafe pit [20 mm], and DTR [25 to 200 lb. {11.3 to 90.7 kg}] NEW detonations) under Alternative 2. The 62 dB CDNL contour would surround the Main Target Area, strafe pit, and the DTR Site. None of the CDNL contours extend beyond the NWSTF Boardman range boundary, suggesting there are no incompatible land uses outside of the NWSTF Boardman range. Activities at these locations would not affect surrounding areas because the 62 dB contour does not extend beyond the range boundary.

To determine the potential for noise complaint risk from people in the surrounding area, PK-15 contours were calculated and plotted in Figure 3.4-18. Under Alternative 2, the area with a high risk of noise complaints is confined within the NWSTF Boardman boundary. Areas with a medium risk of noise complaints would exist beyond the NWSTF Boardman boundary and would extend up to 5 mi. (8.1 km) off the range boundary primarily to the east and west. As land use adjacent to the NWSTF Boardman Range boundary is primarily agricultural, few residences are expected. Inspection of aerial maps of the area within Noise Zone II reveals no residences or other sensitive receptors within the medium noise complaint risk area.

It is important to note that the PK-15 contours are generated from single events. The largest area of impact would be from the 200 lb. (90.7 kg) NEW detonations at the DTR site. However, of the 50 DTR events planned per year, the detonation of 200 lb. (90.7 kg) NEW would only occur twice a year. As described in Chapter 2 (Description of Proposed Action and Alternatives), 33 of the 50 DTR events (67 percent) are 25 lb. (11.3 kg) NEW or less, which have an area of high and medium risk of noise complaints roughly two-thirds the size of that of the 200 lb. (90.7 kg) detonations.

Because noise-generating events from range activities would be intermittent and occur in areas removed from sensitive receptors, sensitive receptors would not likely be exposed to high noise levels from range firing activities under Alternative 2. Thus, range activities under Alternative 2 do not represent a significant degradation in the sound environment.

3.4.3.3.4 Summary

Overall, military training activities on NWSTF Boardman under Alternative 2 include several sources of noise that can be audible in adjacent agricultural and open space areas surrounding NWSTF Boardman. Major sources of noise would include helicopters and fixed-wing aircraft involved in air warfare, electronic combat, strike warfare, and insertion/extraction training activities, as well as impulsive events associated with live-fire activities. A small portion of lands to the west of NWSTF Boardman (conservation lands and agricultural lands) and east (agricultural lands) would have a DNL between 60 and 65 dBA as a result of military training activities. A very small portion of the area outside of the

NWSTF Boardman boundary (0.94 mi.^{2} [2.4 km^2]) has a DNL between 70 and 75 dBA under Alternative 2. This is a reduction in area from approximately 172.4 mi.^{2} (446.5 km^2) that were between 70 and 75 dBA under the No Action Alternative. Noise levels up to 65 dBA are compatible with land uses such as residences, transient lodging, and medical facilities. However, there are no sensitive receptors under 70–75 DNL contours.

Impacts to community sound levels from training activities under Alternative 1 can occur on lands outside of the Target Areas, but they are partially reduced by the training schedule. Aircraft training and demolition activities on NWSTF Boardman would occur primarily during the day, whereas individuals are most sensitive to noise at night. Further, the areas surrounding NWSTF Boardman are primarily agricultural and thus, very few members of the public would be exposed to noise from training activities on NWSTF Boardman (at the few locations [15] where private residences are located amongst the agricultural parcels). Given the above analysis, the total noise impacts of the increased vehicle noise, construction, and arms noise would not change the 65 DNL contour, as shown in Figure 3.4-14. As shown in Figure 3.4-15, these contours represent a reduction in noise levels in comparison to the No Action Alternative. Therefore, the implementation of Alternative 2 would not result in a significant noise impact.

3.4.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.4.3.4.1 Proposed Management Practices

Explosive Ordnance Disposal measures for reducing noise impacts during land detonation training include typically conducting detonation training during normal working hours (10:00 a.m.–4:00 p.m.). DTR activities will not take place after dark. DTR training includes additional management practices to help reduce noise levels for training with charges 100 lb. (45.4 kg) NEW or greater. These could include: training during times with optimal weather conditions to attenuate noise, burying the explosive charge, or bunkering the charge with sand bags. Additionally, detonation training would be conducted only during days when the weather is favorable. Studies have shown that variation of temperature and wind velocity with altitude can cause a noise event to be inaudible at one time (favorable) and audible at another time (unfavorable). A number of factors affect noise propagation during training events and are considered by range managers and users when planning and conducting activities to help mitigate noise impacts. Conditions that can enhance the propagation of sound include steady winds; clear days on which ‘layering’ of smoke, fog, or clouds are observed; cold, hazy, or foggy mornings; large temperature swings on the previous day; and high barometer/low temperatures. These conditions are avoided to the maximum extent possible when scheduling demolition activities.

3.4.3.4.2 Proposed Monitoring

No specific monitoring needs were identified for acoustics.

3.4.3.4.3 Proposed Mitigation Measures

Due to hibernation patterns of the Washington ground squirrel and the nesting of migratory birds, detonations of NEWs above 50 lb. (22.7 kg) are restricted from January through August. Detonations of NEWs greater than 50 lb. (22.7 kg) will be performed between September and December unless necessitated by operational or disposal requirements. Public notice would be given prior to detonation of 100 lb. (45.4 kg) NEW or greater.

3.4.3.5 Summary of Effects and Conclusions

Airborne noise levels generated by the proposed action under the No Action Alternative and Alternatives 1 and 2 would not have significant impacts on sensitive receptors as noise from aircraft and range training activities would be dispersed and intermittent, would not contribute significantly to long-term noise levels, and few or no sensitive receptors would be exposed to these noise events due to the area land use that is affected. Table 3.4-13 summarizes the airborne noise effects for the No Action, Alternative 1, and Alternative 2.

Table 3.4-13: Summary of Effects

Noise Stressor	Summary of Effects and National Environmental Policy Act Determination
No Action Alternative	
NOISE	
Vehicle	• The low number of vehicle trips associated with training activities under the No Action Alternative represent an extremely low percentage of the average traffic volume on Interstate 84 and is insufficient to noticeably affect noise levels. Vehicle traffic on other local roads likewise has no substantial effect on noise levels. Military traffic on local roads is a minor portion of this traffic.
Aircraft	• Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the background noise level, would contribute very little to the hourly average noise level. • Noise levels from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities, with the exception of private residences located on agricultural lands. • The No Action Alternative does not represent a degradation of the noise environment.
Range Noise	• Noise-generating events from training would be intermittent, occur in areas removed from sensitive receptors, and would not expose a significant number of sensitive receptors to high noise levels. CDNL contours would not extend beyond the NWSTF Boardman range boundary; therefore, there are no incompatible land use areas outside of NWSTF Boardman. • The No Action Alternative does represent a significant degradation of noise environment.
Impact Conclusion	• No significant impacts on the noise environment would occur under the No Action Alternative from vehicle, range noise, or aircraft activities.

Table 3.4-13: Summary of Effects (continued)

Noise Stressor	Summary of Effects and National Environmental Policy Act Determination
Alternative 1	
NOISE	
Vehicle	• Future traffic volume increases on Interstate 84 (the only high-volume, high-speed road in the area) associated with training on NWSTF Boardman would be insufficient to noticeably affect noise levels in the areas surrounding NWSTF Boardman. • Increases in vehicle traffic on other local roads, being limited to a few minutes each occurrence, would likewise have no substantial effect on noise levels. Military traffic on local roads would be a minor portion of this traffic. • Training and range-related traffic noise would not substantially affect the noise environment under Alternative 1 when compared to the No Action Alternative.
Construction	• Noise-generating events would be intermittent, occur in areas removed from sensitive receptors, and would not expose a substantial number of human receptors to high noise levels. • No sensitive receptors would likely be exposed to noise from construction activities under Alternative 1 when compared to the No Action Alternative.
Aircraft	• Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the background noise level, would contribute very little to the hourly average noise level. • Though the number of sorties increases, noise levels from aircraft activities remain compatible with land uses such as residences, transient lodging, and medical facilities. • Given that no area would experience an increase of 1.5 dB into or within the 65 DNL contour, the implementation of the Alternative 1 would not result in a significant noise impact at NWSTF Boardman.
Range Noise	• Noise-generating events would be intermittent, occur in areas removed from sensitive receptors, and would not expose a significant number of sensitive receptors to high noise levels. • CDNL contours extend beyond the NWSTF Boardman range boundary; however, the primary land use is agricultural and livestock farming with occasional residences within the immediate vicinity of the eastern NWSTF Boardman boundary, which is compatible with these modeled CDNLs. Therefore, there are no incompatible land use areas adjacent to NWSTF Boardman and no significant impacts to the noise environment when compared to the No Action Alternative.
Impact Conclusion	• With respect to the No Action Alternative, no significant impacts on the noise environment would occur under Alternative 1 from vehicle, aircraft activities, construction, or range noise.

Table 3.4-13: Summary of Effects (continued)

Noise Stressor	Summary of Effects and National Environmental Policy Act Determination
Alternative 2	
NOISE	
Vehicle	• Future traffic volume increases on Interstate 84 (the only high-volume, high-speed road in the area) associated with training on NWSTF Boardman would be insufficient to noticeably affect noise levels in the areas surrounding NWSTF Boardman. • Increases in vehicle traffic on other local roads, being limited to a few minutes each occurrence, would likewise have no substantial effect on noise levels. Military traffic on local roads would be a minor portion of this traffic. • Training and range-related traffic noise would not substantially affect the noise environment under Alternative 2 when compared to the No Action Alternative.
Construction	• Noise-generating events would be intermittent, occur in areas removed from sensitive receptors, and would not expose a substantial number of human receptors to high noise levels. • No sensitive receptors would likely be exposed to noise from construction activities under Alternative 2 when compared to the No Action Alternative.
Aircraft	• Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the background noise level, would contribute very little to the hourly average noise level. • Though the number of sorties increases, noise levels from aircraft activities remain compatible with land uses such as residences, transient lodging, and medical facilities. • Given that no area would experience an increase of 1.5 dB into or within the 65 DNL contour, the implementation of the Alternative 2 would not result in a significant noise impact at NWSTF Boardman.
Range Noise	• Noise-generating events would be intermittent, occur in areas removed from sensitive receptors, and would not expose a significant number of sensitive receptors to high noise levels. • CDNL contours extend beyond the NWSTF Boardman range boundary; however, the primary land use is agricultural and livestock farming with occasional residences within the immediate vicinity of the eastern NWSTF Boardman boundary, which is compatible with these modeled CDNLs. Therefore, there are no incompatible land use areas outside of NWSTF Boardman, and no significant impacts to the noise environment when compared to the No Action Alternative.
Impact Conclusion	• With respect to the No Action Alternative, no significant impacts on the noise environment would occur under Alternative 2 from vehicle, aircraft activities, construction, or range noise.

Notes: LATT = Low Altitude Tactical Training, NWSTF = Naval Weapons Systems Training Facility, NEW = Net Explosive Weight, lb. = pounds, CDNL = C-weighted Day-Night Sound Level

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3.5 VEGETATION

3.5.1 INTRODUCTION

3.5.1.1 Overview

Naval Weapons Systems Training Facility (NWSTF) Boardman contains unique and remnant vegetation communities important to the region’s natural heritage. Proposed activities that could directly affect vegetation are limited to the land area of NWSTF Boardman. Vegetation in areas adjacent to NWSTF Boardman could be indirectly affected by invasive plants and wind-transported soils. Therefore, the study area for vegetation includes NWSTF Boardman and adjacent areas that could be affected indirectly.

The Affected Environment section describes the major vegetation communities or habitat types at NWSTF Boardman. Descriptions of “special status species” are also provided. For the purposes of this Environmental Impact Statement (EIS), special status plant species include:

- Species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA) and species proposed for listing.
- Species considered by the United States (U.S.) Fish and Wildlife Service (USFWS) as a candidate for ESA listing.
- Species of concern identified by USFWS. As an informal category not defined by the ESA, the term commonly refers to species that are declining or appear to be in need of conservation. The USFWS Oregon Ecological Services Field Office maintains a list of species of concern (U.S. Fish and Wildlife Service 2014) for the region.
- Species classified as threatened or endangered by the Oregon Department of Agriculture under the Oregon ESA.
- Species on the Oregon Biodiversity Information Center lists 1, 2, 3, or 4.

Jurisdictional wetlands do not exist at NWSTF Boardman (U.S. Department of the Navy 2012). Accordingly, wetlands and wetlands vegetation are not discussed in further detail.

3.5.1.2 Regulatory Framework

3.5.1.2.1 Endangered Species Act

The ESA of 1973 (16 United States Code [U.S.C.] 1531 to 1543) established protection over and conservation of threatened and endangered species and the ecosystems on which they depend. No plant species listed or proposed for listing under ESA occur at NWSTF Boardman. Therefore, ESA is not considered further in this section. A more detailed description of ESA is provided in Section 3.6.1.2 (Regulatory Framework).

3.5.1.2.2 Federal Noxious Weed Act

The Federal Noxious Weed Act (FNWA) of 1974 was enacted in 1975 with the purpose of managing and controlling the spread of noxious weeds. Pursuant to the Act, the U.S. Secretary of Agriculture was given the authority to declare plants “noxious weeds,” and limit the interstate spread of such plants without a permit. The FNWA was amended by the Farm Bill on November 28, 1990. The amendment requires all federal land managing agencies to (1) designate an office or person trained in managing undesirable plant species to develop and coordinate a program to control such plants on the agency's land, (2) ensure that the agency’s budget process adequately funds the plant management program, (3) develop and implement cooperative agreements with the States regarding undesirable plants on agency land, and (4) establish integrated management systems to control or contain undesirable plants targeted under the cooperative agreements.

3.5.1.2.3 Executive Order 13112 Invasive Species

Executive Order (EO) 13112 *Invasive Species* directs federal agencies whose actions may affect the status of invasive species to use relevant programs and authorities to:

- Prevent the introduction of invasive species.
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner.
- Monitor invasive species populations accurately and reliably.

In addition, agencies may not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the agency has determined that the benefits of such actions clearly outweigh the potential harm. All feasible and prudent measures to minimize risk of harm must also be taken in conjunction with the actions.

3.5.1.3 Determination of Significance

The impact analysis for vegetation considered effects of the Proposed Action on plant communities and populations, including whether vegetation would be permanently or temporarily lost, disturbed, or degraded. Potential changes in plant communities arising from invasive species and wildfire were also considered. The significance of impacts on vegetation was considered in the context of local plant communities and populations of special status plant species. Given the quantity and quality of habitat at NWSTF Boardman and on adjacent undeveloped lands to the west, many of the local plant communities are regionally important. Therefore, impacts to local populations could have regional implications. Factors used in determining the significance of impacts on vegetation included the amount of habitat permanently lost, in relationship to the abundance of that habitat type at NWSTF Boardman and adjacent undeveloped lands, and the extent to which proposed activities would contribute to existing invasive plant management issues at NWSTF Boardman and adjacent undeveloped lands.

3.5.2 Affected Environment

3.5.2.1 Columbia Plateau Ecoregion

NWSTF Boardman is situated in the lower Columbia Basin, within the Columbia Plateau Ecoregion. The Columbia Plateau, which occupies about two-thirds of eastern Washington and extends into north central Oregon, is an arid sagebrush steppe (shrub-steppe) and grassland, surrounded on all sides by moister, predominantly forested, mountainous ecological regions (Thorson et al. 2003). “Steppe” is a Russian word that means a vast treeless plain. The region experiences cool winters and hot summers, and the annual average precipitation is about 12 inches (30.5 centimeters). Most of the land in the Oregon portion of this ecoregion is privately owned (85 percent); about 57 percent is range, pasture, or grassland; and almost 37 percent is agricultural cropland (Oregon Department of Fish and Wildlife 2006).

Shrub-steppe habitats are open grass-dominated communities and are usually found on loamy, wind-deposited (loess) soils. In the Columbia Plateau Ecoregion, shrub-steppe communities can be broadly divided into two elevational types. Within 10 miles (16.1 kilometers) of the Columbia River, sandy shrub-steppe communities occur on unstable, well-drained soils. These include grasslands dominated by needle-and-thread grass; shrub-steppe habitats dominated by bitterbrush and needle-and-thread grass or Indian rice grass; and sand dune communities characterized by sagebrush, bitterbrush, and western juniper. There is usually a component of bare ground or open sand present. Farther from the Columbia River, big sagebrush steppe communities include basin big sagebrush/needle-and-thread grass; basin wildrye and bluebunch wheatgrass steppe; and Wyoming sagebrush/bluebunch wheatgrass, which formerly occupied the low-elevation, loess uplands in the Columbia Plateau (Oregon Department of Fish and Wildlife 2006).

In the Columbia Plateau Ecoregion, grasslands include river terrace grasslands, prairies, canyon slopes and rocky ridges. At low- and mid-elevations, semi-desert grasslands are dominated by drought-resistant perennial bunchgrasses such as needle-and-thread, dropseed, threeawn and muhly, and may have scattered shrubs. Palouse grasslands occur in flat areas with deep soils and are dominated by bluebunch wheatgrass, Idaho fescue, and other grasses and forbs. Canyon and foothill grasslands are found on the steeper, rocky slopes surrounding the major rivers in this region and are dominated by bluebunch wheatgrass, Idaho fescue, Sandberg's bluegrass, balsamroot, and other forbs (Oregon Department of Fish and Wildlife 2006).

The Oregon Conservation Strategy identifies grasslands and sagebrush steppe as "strategy habitats" in the Columbia Plateau Ecoregion (Oregon Department of Fish and Wildlife 2006). Strategy habitats have the greatest conservation need based on factors such as historical ecological importance and degree of loss since European settlement. In the lower elevations of the Columbia Plateau, shrub-steppe and grassland communities have been almost entirely replaced by irrigated agriculture. Remnant habitats occur on public lands such as NWSTF Boardman and the Umatilla Chemical Depot, on the private lands such as Boardman Conservation Area and Lindsay Prairie Preserve, and in scattered patches along roadsides and fields. These habitats have also been affected by grazing, alteration of historic fire regimes, and invasive species. Key conservation issues and ecoregional-level limiting factors in the Columbia Plateau Ecoregion include water availability, soil erosion, habitat fragmentation, and invasive species (Oregon Department of Fish and Wildlife 2006).

3.5.2.2 Vegetation Communities at NWSTF Boardman

The vegetation at NWSTF Boardman primarily consists of shrub-steppe and grassland habitats. In contrast to much of the surrounding area, large-scale agriculture has not taken place at NWSTF Boardman. As a result, the installation persists as a large tract of predominately native shrub-steppe and grassland habitats. In fact, the installation and the adjacent Boardman Conservation Area represent one of the largest remaining single blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia Plateau Ecoregion (approximately 69,000 acres [ac.] [27,923 hectares {ha}]) (National Audubon Society 2011).

The composition of existing vegetation communities at the installation is influenced by numerous factors including climate, soils, military use, wildfire, past grazing, a limited amount of past agricultural use, and introduction of invasive plants (noxious weeds). In particular, two related factors, wildfire and invasive plants, have affected vegetation in recent years. Since 1998, more than 85 percent of NWSTF Boardman has been burned by wildfires, which have caused short- and long-term habitat alterations. Large fires swept portions of the installation in 1998 (17,514 ac. [7,088 ha]), 2007 (11,664 ac. [4,720 ha]), 2008 (30,612 ac. [12,388 ha]), and 2015 (approximately 16,000 ac. [6,475 ha]), while smaller areas burned in 2002 (1,639 ac. [663 ha]), 2009 (618 ac. [250 ha]), 2011 (acreage not mapped), and 2013 (1,480 ac [599 ha]) (see Section 3.13, Wildfire, and Figure 3.13-1). The 1998, 2002, 2007, and 2008 fires were started by lightning strikes (U.S. Department of the Navy 2012), the 2011 fire was training-related, and the causes of the 2009 and 2013 fires were not confirmed. The 2015 fire was started by spontaneous combustion of a hay stack west of and outside NWSTF Boardman, which spread onto the range. Training-related wildfires occur occasionally at NWSTF Boardman. Range safety monitoring by participating military units allows for early detection of training-related fires and rapid response. Therefore, fires that start during training activities are typically contained to relatively small areas compared to lightning-caused fires, which might go undetected for a period of time after ignition.

Historically, the area was comprised of fire-adapted vegetation communities with fire return intervals that likely ranged from about 20 to 70 years based on information for similar habitats (Leenhouts 1998, Paysen et al. 2000). With the widespread introduction of invasive, non-native annual grasses such as cheatgrass, the amount of fuel for wildfires has increased. Wildfires now tend to be more frequent and more severe (burn hotter), and can be long-term or permanent habitat altering events. Frequent and hot burning fires like those that have occurred at NWSTF Boardman favor a shift from shrublands to grasslands. Humple and Holmes (2001) documented decreases in sagebrush cover and increases in cover of grass, primarily cheatgrass, in study plots following the 1998 fire at NWSTF Boardman.

Maintaining an up-to-date vegetation inventory and associated mapping for NWSTF Boardman has been a challenge given the recent wildfire history. Habitat types were mapped and described for the entire installation in 1997 by interpreting aerial photographs and conducting ground-truthing studies (U.S. Department of the Navy 2012). In 2007, the U.S. Department of the Navy (Navy) initiated a survey to update vegetation mapping for the entire installation. However, the large 2007 wildfire (11,664 ac. [4,720 ha]) occurred soon after the aerial imagery data were collected. A decision was made not to finalize the vegetation mapping effort because fire-induced vegetation changes rendered the imagery data obsolete. The *NWSTF Boardman Integrated Natural Resources Management Plan (INRMP)* (U.S. Department of the Navy 2012) includes a project recommendation to collect high-resolution aerial photography to map all vegetation and produce geographic-information-system-based vegetation mapping in the near future.

The remainder of this section provides descriptions of vegetation communities and habitat types based on information taken from the *NWSTF Boardman INRMP*. As discussed above, the best available vegetation/habitat data are from 1997, prior to a series of wildfires that occurred from 1998 through 2009. Vegetation conditions have changed at the installation since 1997 and will continue to change based on future fire regimes and other factors such as invasive species.

A list of plant species known to occur on NWSTF Boardman is provided in Appendix F (Additional Biological Information). The following six major plant associations occur on NWSTF Boardman (U.S. Department of the Navy 2012).

- Big sagebrush/bluebunch wheatgrass
- Bluebunch wheatgrass/Sandberg's bluegrass
- Big sagebrush/western needle-and-thread grass
- Antelope bitterbrush/needle-and-thread grass
- Needle-and-thread grass/Sandberg's bluegrass
- Snowy buckwheat/Sandberg's bluegrass

Lesser represented communities include the matchweed (an introduced species) variant of the big sagebrush/bluebunch wheatgrass association, and relict stands of western juniper/big sagebrush/bluebunch wheatgrass association. It should also be noted that large portions of nearly all of these associations are currently invaded by cheatgrass. Finally, there are some largely unvegetated sand dune and "alkali" areas.

Sagebrush/wheatgrass and wheatgrass/bluegrass plant associations dominate the southern half of NWSTF Boardman where soils are deeper and loamier. The presence of sagebrush differentiates these communities. Sagebrush is more prevalent in the draws and lowlands where deep, subsurface water resources are easier obtained. Both of these communities have been severely impacted by grazing (ca. 1870s to 1950s) and now are largely dominated by cheatgrass. Healthy stands of wheatgrass are mostly limited to small patches on north-facing slopes, while sagebrush/wheatgrass association stands have been often heavily invaded with cheatgrass.

Moving south to north on the facility, the soils become sandier resulting in a replacement of the sagebrush/wheatgrass and wheatgrass/bluegrass plant associations with the sagebrush/needle-and-thread grass and needle-and-thread grass/bluegrass associations. Prior to the invasion of alien weedy annuals around the early 1900s, much of the land now supporting these associations was characterized as isolated patches of western needle-and-thread surrounded by blowing sand. Outlines of the extensive dune systems that dominated this portion of the range are still evident in aerial photographs. While much of the original needle-and-thread stands have been replaced by dense stands of cheatgrass, needle-and-thread appears to also be establishing in areas of former dunes now stabilized by weedy annuals, including cheatgrass. Quality stands of needle-and-thread can still be found on the center portion of the range, especially where historically protected from grazing in the Research Natural Areas (RNAs). The resilience of needle-and-thread, compared to bluebunch wheatgrass, to withstand grazing probably resides in its lesser palatability to livestock. However, gray and green rabbitbrush now dominate large portions of these communities because of disturbance from fire and historic grazing.

On the farthest northern edge of NWSTF Boardman is found the sandiest soils supporting the bitterbrush/needle-and-thread association and, where parent soils are slightly rocky, small patches of buckwheat/bluegrass plant associations. Very little needle-and-thread is found in these communities because it has either been replaced by cheatgrass, Russian thistle, and other alien weedy annuals, or has not yet colonized these areas since dune stabilization. Finally, due east of Research Natural Area (RNA)-C (Figure 1-5) is a small community of matchweed, a small, non-native shrub that apparently established in the John Day River drainage in the late 1940s and has been moving eastward since. This plant is an indicator of previous severe grazing.

In their pristine state, apparently none of these plant associations supported a diverse floristic composition, largely because of harsh climatic conditions and the deep soil lichen layers that developed between the grasses. Usually no more than one shrub and one or two species of grass, along with soil lichens and bare ground, accounted for greater than 90 percent of the ground cover. Phlox, lomatium, yarrow, and various members of the pea family were the most conspicuous forbs. However, livestock trampling of the lichen layer and intensive grazing of the palatable forage species has encouraged the invasion of alien weedy annuals such as cheatgrass, Russian thistle, tumblemustard, and whitlow-grass. It has dramatically increased the number of unpalatable native species, such as hairy golden-aster in the sagebrush/wheatgrass plant associations, and fiddleneck tarweed, lance-leaf scurf-pea, and hairy plantain in the needle-and-thread grass associations.

Table 3.5-1 provides a summary of major habitat types that were identified during the mapping effort completed in 1997 (U.S. Department of the Navy 2012). Habitat types are units that can be mapped with discrete characteristics that separate them from other habitat types, and provide a specific set of components important as life requisites for specific wildlife species. Most habitat types are based loosely on the plant communities described earlier using vegetative structure and floristic composition as classification parameters.

Table 3.5-1: Summary of Habitat Types and Acreage at NWSTF Boardman

Habitat Type	Size (Acres)[1]	Description	Wildlife Uses
Sagebrush	7,415	Sagebrush stands can be found throughout much of the facility, but are most prevalent in and near Juniper Canyon. Sagebrush can be structurally separated into a lowland type of larger plants with an understory of cheatgrass or sandy bare ground, and a structurally shorter upland type with lichen typically covering the understory.	Birds such as the black-billed magpie, Brewer's blackbird, lark sparrow, and loggerhead shrike appear to prefer the larger lowland sagebrush, while the sage sparrow and Brewer's sparrow may prefer the upland sage.
Bitterbrush	2,555	Antelope bitterbrush dominates large portions of the sandy-soiled region in the northern edge of the facility. Structurally it can become very tall (greater than 6 feet) and is sometimes co-dominated with gray rabbitbrush.	Larger bitterbrush plants provide nesting habitat for black-billed magpies, black-throated sparrows, and loggerhead shrikes, and perching habitat for burrowing owls. It also provides important cover for black-tailed jackrabbits and northern sagebrush lizards.
Bunchgrass	12,100	Bunchgrass habitat types include areas on the central and northern portion of the facility dominated by western needle-and-thread grass, and on the southern end by bluebunch wheatgrass. Portions of these habitats have been purposely historically protected from grazing.	Wildlife species typically found here include the grasshopper sparrow and Washington ground squirrel.
Open Low Shrub	9,150	The low shrub habitat type includes areas throughout the facility dominated by gray rabbitbrush, although green rabbitbrush and matchweed may comprise a significant portion of the shrub component. The presence of rabbitbrush on the facility, extensive in some areas, is largely a result of past fires as both rabbitbrush species are fire-tolerant, especially compared to other dominant shrubs.	The black-tailed jackrabbit, northern pocket gopher, gray partridge, and western meadowlark are among the dominant wildlife species found here.
Annual Grass/Forb	15,840	Annual grass/forb habitats are the areas on the facility dominated by cheatgrass, or co-dominated with the perennial Sandberg's bluegrass, usually associated with weedy forbs such as lance-leaf scurf-pea, fiddleneck tarweed, Jim Hill mustard, whitlow-grass, and hairy plantain. These habitats typify areas that were once heavily disturbed by grazing or crop production, or have invaded sandy areas that they have subsequently stabilized.	This habitat type provides nesting habitat for long-billed curlews, burrowing owls, horned larks, and western meadowlarks, and Great Basin pocket mice are very common here.

Table 3.5-1: Summary of Habitat Types and Acreage at NWSTF Boardman (continued)

Habitat Type	Size (Acres)[1]	Description	Wildlife Uses
Juniper	Not applicable[2]	The juniper habitat type includes both the small juniper "forest" found in the Juniper Canyon, and the scattered juniper trees found on the periphery of Juniper Canyon and the western edge of the facility. In 1999 there were 188 mature juniper trees found on the facility. Some of these trees have since died and a number of young junipers have been found.	Junipers provide nesting habitat for Swainson's hawks, ferruginous hawks, ravens, long-eared owls, western kingbirds, and black-billed magpies. They also provide shade for mule deer and cover for porcupines.
Human Structures/Disturbed	145	This habitat type includes buildings associated with the existing headquarters area, previous locations of buildings that have been demolished, and disturbed areas such as the old moving target indicator track, the main bulls-eye, the old cattle corrals, and used weapons accumulation areas.	Buildings may provide habitat for a variety of non-native pests such as starlings, house sparrows, and house mice. The observation tower in the southeastern corner of the target area has been used for several years by nesting ravens.
Dune	210	Dune habitats are found mostly on the north central end of the facility and within central Juniper Canyon.	Sagebrush lizards are commonly found along the dune edges.
Alkali	45	Alkali habitats occur in southern Juniper Canyon and at Well Springs. These habitats are devoid of vegetation.	The short-horned lizard is one of the few wildlife species found here.

[1] Acreages are based on data collected in 1997, prior to a series of lightning-caused wildfires.
[2] Acreage was not calculated because most junipers are scattered and largely fall within another habitat type.
Source: U.S. Department of the Navy 2012

3.5.2.3 Invasive Plants and Weeds

The term “invasive species” is defined by Presidential EO 13112 to mean “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The EO goes on to define an alien species as any species not native to a particular ecosystem, including the seeds, eggs, spores, or other biological material capable of propagating that species. Exotic invasive plants and animals have the potential to cause vast ecological and economical damage, and sometimes pose human health impacts in areas they infest. Economic costs of invasive plants and weeds for Oregon are estimated at $120 million a year for 21 species of noxious weeds, resulting in agricultural production losses, fire damage, habitat loss and transition, and control costs (Cusack et al. 2009).

Invasive plants and weeds, which are often referred to as “noxious weeds,” can degrade wildlife habitat quality and unnaturally increase fuel loading and wildfire risk in heavily infested areas. For instance, the exotic annual cheatgrass (*Bromus tectorum*) is fast replacing sagebrush communities throughout the Columbia Basin and nearby regions in the western United States, impacting native plant communities and altering fire regimes, which contributes to the long-term persistence of this weedy species. Conversion of shrub-steppe vegetation to annual grasslands is occurring on NWSTF Boardman, as evidenced by the increased fire frequency and intensity (U.S. Department of the Navy 2012). Other weed species identified at NWSTF Boardman include spikeweed (*Hemizonia pungens*), yellow starthistle

(*Centaurea solstitialis*), diffuse knapweed (*Centaurea diffusa*), rush skeletonweed (*Chondrilla juncea*), scotch thistle (*Onopordum acanthium*), cereal rye (*Secale cereale*), perennial pepperweed (*Lepidium latifolium*), and medusahead rye (*Taeniatherum caput-medusae*) (The Nature Conservancy 1997, U.S. Department of the Navy 2012) (Table 3.5-2).

Table 3.5-2: Major Invasive Plants and Noxious Weeds at NWSTF Boardman

Common Name	Scientific Name	Oregon Classification[1]	Morrow County Classification[2]	Introduction Pathway and Spread at NWSTF Boardman[3]
Cheatgrass	*Bromus tectorum*	-	-	Upwind seed source and disturbed soil, vehicle spread, fires.
Diffuse knapweed	*Centaurea diffusa*	B	B	Upwind seed source and disturbed soil, vehicle spread, fires.
Yellow starthistle	*Centaurea solstitialis*	B, T	A	Primarily associated with roads and fence lines. Upwind seed source and disturbed soil, vehicle spread.
Spikeweed	*Hemizonia pungens*	B	A	Associated with alkaline soils of Juniper Canyon and Well Spring, disturbed soil colonizer.
Rush skeletonweed	*Chondrilla juncea*	B, T	A	Not known.
Cereal rye	*Secale cereale*	-	B	Agricultural remnant.
Medusahead rye	*Taeniatherum caput-medusae*	B	B	Annual grass species with potential to out-compete cheatgrass. Wind dispersal from upland seed source, disturbed soil, vehicle spread, and fires.
Scotch thistle	*Onopordum acanthium*	B	B	Primarily associated with roads and fence lines. Upwind seed source and disturbed soil, vehicle spread.
Perennial pepperweed	*Lepidium latifolium*	B, T	B	Associated with mesic soils of Juniper Canyon, disturbed soil colonizer.

[1] Source: Oregon Department of Agriculture 2011. B = a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties. T = priority noxious weeds designated by the State Weed Board as target weed species and warrant implement statewide management plans.
[2] Source: Morrow County Weed Classification. A = Weeds of known economic importance occurring in the county in small enough infestations to make eradication practicable. B = Weeds of economic importance and of limited distribution in the county; is subject to control or eradication where feasible.
[3] Source: The Nature Conservancy 1997
Note: NWSTF = Naval Weapons Systems Training Facility

Weeds in Oregon are categorized under the Oregon State Noxious Weed Classification System depending on economic importance and feasibility of control. Morrow County also maintains a weed classification list, which is more specific to local concerns and is relied on to determine specific areas of concern at NWSTF Boardman. Major invasive species and weeds documented at NWSTF Boardman are listed in Table 3.5-2 along with their classification and potential pathways of introduction to NWSTF Boardman.

Landscape factors other than fire can alter natural vegetation succession, such as grazing, agricultural practices, and ground disturbance (e.g., off-road vehicle traffic) (Young et al. 2001). Grazing leases (for cattle and sheep) were cancelled at NWSTF Boardman in 2002. Termination of agricultural outleases in 2002 ended alfalfa production on 240 ac. (97 ha) (U.S. Department of the Navy 2012).

Plants invade natural habitats, such as shrub-steppes of the Columbia Basin, through specific pathways. Cheatgrass, thought to originate in southwest Asia, may have been introduced through the importation of contaminated grain (Pellant 1996). Other non-intentional pathways may include contaminated feed containing invasive plant seeds, shipments of cargo, contaminated vehicles, and contaminated fill material used in construction.

3.5.2.4 Special Status Plant Species

In 2003 and 2004, field surveys of NWSTF Boardman were conducted to update information on all special status plant species (U.S. Department of the Navy 2004). There are no Federal threatened or endangered species of vascular plants, lichen, or fungi occurring on NWSTF Boardman (U.S. Department of the Navy 2012). As summarized in Table 3.5-3, two plant species that are considered rare in Oregon have been documented at NWSTF Boardman (Quade 1994, U.S. Department of the Navy 2004).

Table 3.5-3: Special Status Plant Species Known to Occur at NWSTF Boardman

Common Name	Scientific Name	Federal Status	State Status	OBIC Rank	Description
Stalked-pod milk-vetch	*Astragalus sclerocarpus*	None	None	List 3	Associated with sagebrush-steppe from Washington to northeast Oregon along both sides of the Columbia River. Specific habitats include sandy barrens, dunes, xeric (dry) sites in sagebrush-steppe and lower elevation zones characterized by ponderosa pine. This milk-vetch blooms in April through June, with seeds setting in late June through July. This species was common and widespread across NWSTF Boardman in the 2003–2004 surveys.
Columbia milk-vetch	*Astragalus succembens*	None	None	List 4	Associated with sagebrush desert to lower foothills characterized by xeric (dry) dunes and/or sandy soils. This milk-vetch blooms in April through May, and sets seed in late May and June. This species was common and widespread across NWSTF Boardman in the 2003–2004 surveys.

Notes: OBIC = Oregon Biodiversity Information Center, NWSTF = Naval Weapons Systems Training Facility
Sources: Quade 1994; U.S. Department of the Navy 2004, 2012.

Two other notable occurrences from the 2003 to 2004 surveys included Columbia cut-leaf (*Hymenopappus filifolius*), which was reclassified as common during the 2001 Oregon rare plant review and now has no special plant status, and buckwheat milk-vetch (*Astragalus carcinus*). Although buckwheat milk-vetch is not a rare plant, it is a notable collection because it was previously not known from the Oregon side of the Columbia River (U.S. Department of the Navy 2012).

Laurence's milk-vetch (*Astragalus collinus* var. *laurentii*), an Oregon threatened species and USFWS species of concern, occurs in the Columbia Basin portion of Morrow County. However, this species is not on Quade's (1994) extensive list of vascular plants occurring on the facility. The surveys conducted in 2003 and 2004 targeted this species, but none were found (U.S. Department of the Navy 2004).

Therefore, Laurence's milk-vetch is not expected to occur at NWSTF Boardman and is not addressed in further detail in this EIS.

3.5.2.5 Biological Soil Crust

Biological soil crusts are an intimate association between soil particles and cyanobacteria, algae, microfungi, lichens, and bryophytes (in different proportions) that live within or on top of the uppermost millimeters of soil. These communities have been known by a variety of names, including cryptobiotic, cryptogamic, and microbiotic soil crusts. They are found in all dryland regions of the world, including the polar regions, and in all vegetation types within these lands. In these landscapes, biological soil crusts often cover all soil spaces not occupied by trees, grasses, or shrubs and can comprise over 70 percent of the living ground cover. Biological soil crusts at NWSTF Boardman are primarily comprised of cyanobacterias and mosses with some lichens.

The presence of these organisms on the soil surface increases soil stability. Well-developed crusts (with lichens and mosses) on both silt and sandy soils have 2 to 130 times greater resistance to soil erosion than less well-developed crusts or bare soil (Belnap and Gillette 1997). Because biological soil crusts are photosynthetic they also contribute carbon to the underlying soils. Free-living and lichenized cyanobacteria can also convert atmospheric nitrogen into bio-available nitrogen, and thus are an important source of this often limiting nutrient. All these organisms also secrete compounds that increase the bio-availability of phosphorus.

3.5.2.6 Research Natural Areas

Three RNAs (A, B, and C) were established on NWSTF Boardman in 1978 and are co-managed by The Nature Conservancy under a Memorandum of Understanding with the Navy (Figure 1-5). The RNAs are part of a federal government system established for research and educational purposes. Natural features are preserved for scientific purposes and natural processes are allowed to dominate. The RNA program was created to (1) preserve examples of all significant natural ecosystems for comparison with those influenced by man, (2) provide educational and research areas for ecological and environmental studies, and (3) preserve gene pools of threatened and endangered plants and animals. The RNAs on NWSTF Boardman were the first established on Department of Defense lands. The Nature Conservancy activities in the RNAs include research and monitoring of the native habitat types and wildlife species, as well as control of noxious weeds. The RNAs are fenced and, with the exception of RNA-A, access is normally limited to research and management activities such as weed control. RNA-A is located within the Main Target Area, portions of which are subjected to disturbance from training and maintenance activities. As discussed in Section 3.5.3.4.1 (Proposed Management Practices), the Navy is proposing to relocate RNA-A.

3.5.2.7 Current Requirements and Management Practices

The following is a summary of current requirements and practices applicable to vegetation at NWSTF Boardman.

- Vegetation is managed under the *NWSTF Boardman INRMP*. Actions focus on minimizing disturbance, controlling invasive plants and weeds, and restoring of native habitats.
- All training and facility operation actions at NWSTF Boardman are reviewed by the Naval Air Station Whidbey Island/NWSTF Boardman Natural Resources Manager for potential invasive plant and noxious weed issues.

3.5.3 Environmental Consequences

3.5.3.1 No Action Alternative

3.5.3.1.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities

Training and Maintenance Activities

Under the No Action Alternative, the primary causes of ground disturbances would be target maintenance and non-explosive practice munitions impacting the ground surface within the Main Target Area and fire break maintenance. Ground vehicle traffic would be very limited and would occur on the existing road network. Direct effects of vehicle traffic on vegetation would be negligible, but vehicles would act as a dispersal pathway for invasive plants (discussion below in Invasive Plants and Weeds).

Habitat types that occur in the Main Target Area include annual grass/forb, bunchgrass, open-low shrub, and disturbed, based on 1997 data. Lightning-caused wildfires burned portions of this area in 1998 and all of the area in 2008. Numerous occurrences of the special status plants stalked-pod milk-vetch and Columbia milk-vetch were recorded in the Main Target Area during the 2003–2004 plant surveys (U.S. Department of the Navy 2004). Most of the Main Target Area was classified as medium or medium-low habitat quality during the 2003–2004 plant surveys. A low density of diffuse knapweed was recorded throughout most of the Main Target Area during the 1997 noxious weed inventory (The Nature Conservancy 1997).

The Main Target Area includes the main bull's eye, the strafing pit, the laser-guided training range bull's eye, and several single targets or grouped target sets (e.g., old vehicles, tanks, etc.). The vegetation in and around each of these targets must be maintained or removed for fire safety and to provide a viable visual cue to pilots. This is accomplished by mechanical disturbance (i.e., plowing or disking) with a tractor one time per year. Approximately 23 ac. (9.3 ha) in the Main Target Area would be subjected to this maintenance under the No Action Alternative. Most non-explosive practice munitions would impact the ground in maintained areas that lack vegetation and would have little additional effect on vegetation. In addition, fire breaks throughout NWSTF Boardman are maintained annually by mechanical disturbance (e.g., plowing or disking) with a tractor. Approximately 462 ac. (187 ha) of fire breaks are maintained. A total area (target areas and fire breaks) of approximately 485 ac. (196 ha) would continue to be maintained by mechanical disturbance under the No Action Alternative.

The Main Target Area and fire breaks have been subjected to similar maintenance and disturbance regimes for years. Therefore, ground disturbing activities under the No Action Alternative would not result in additional loss of vegetation communities or additional direct alteration of habitat. Ground disturbing activities under the No Action Alternative would result in direct, long-term minor effects on vegetation. The effects would be localized, and therefore would have no significant impacts on vegetation.

Invasive Plants and Weeds

Vegetation communities at NWSTF Boardman would continue to be affected by invasive plants under the No Action Alternative. Ground disturbing activities described above would continue to indirectly affect native plant communities by creating favorable conditions for establishment of invasive plants and providing pathways for seed dispersal. Areas disturbed mechanically for target maintenance would be susceptible to invasion and frequent treatments would be necessary to prevent establishment. If invasive plants become established in an area that requires maintenance, then the subsequent mechanical treatment would likely aid in wind dispersal of seeds and exacerbate the spread of invasive plants. Seeds could also be transported to other areas by the equipment. Routine vehicle movements on the road network would also contribute to seed dispersal.

The Navy implements invasive plant and weed controls annually at NWSTF Boardman based on available funding and identified priorities. The Nature Conservancy has undertaken weed control on the RNAs (Figure 1-5) on an annual basis for the last 18 years and, to a lesser extent, outside the RNAs. Continuation of these management actions would provide long-term benefits to native plant communities, but the benefits would be localized.

While training activities under the No Action Alternative would contribute to the invasive plant problems at NWSTF Boardman, their overall contribution is minor when considered in the context of landscape-scale disturbances such as wildfire. Overall, invasive plants would continue to have long-term impacts on vegetation under the No Action Alternative. These overall effects would be widespread. Although the indirect effects specifically associated with training activities would be long term, these impacts would be minor. Invasive plant issues specifically associated with training activities would have no significant impact on vegetation under the No Action Alternative.

Training-Related Wildfire

Section 3.13 (Wildfire) describes the fire risk potential of activities under the No Action Alternative and current fire protection measures. The No Action Alternative would not alter current fire cycles (intensity and frequency) and would not introduce new ignition sources. Since 1998, more than 85 percent of NWSTF Boardman has been burned by wildfires. The 1998, 2002, 2007, and 2008 fires were started by lightning strikes (U.S. Department of the Navy 2012), the 2011 fire was training-related, and the causes of the 2009 and 2013 fires were not confirmed.

While the effects of large, lightning-caused wildfires on vegetation at NWSTF Boardman are not fully known at this time, the general pattern observed is a decrease in native sagebrush and other shrub cover accompanied by an increase in non-native cheatgrass cover (Humple and Holmes 2001). In turn, increased cheatgrass cover can increase fire frequency and intensity (Marr 2001, U.S. Department of the Navy 2012).

Occasional training-related fires would be expected to occur under the No Action Alternative, but the area affected would be small based on implementation of current fire protection measures. Short- and long-term impacts to vegetation would occur, but the area affected would be small relative to NWSTF Boardman as a whole. Wildfires caused by training activities under the No Action Alternative would have no significant impacts on vegetation.

3.5.3.2 Alternative 1

3.5.3.2.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities

Construction Activities

Site excavation, grading, and equipment operations during construction of the proposed range enhancements for Alternative 1 would result in temporary disturbances to the ground surface. The area of disturbance for individual construction projects would range from less than 1 to 40 ac. (0.4 to 16 ha). The total area of disturbance would be 92 ac. (37 ha) (0.2 percent of NWSTF Boardman), 13 ac. (5.3 ha) of which are previously disturbed (Table 2-5). Approximately 79 ac. (32 ha) of previously undisturbed area would be affected; about 49 ac. (20 ha) would be permanently converted to development, and about 30 ac. (12 ha) would be temporarily disturbed and revegetated in accordance with the post-construction restoration plan (Appendix F, Additional Biological Information). Construction activities for the range enhancements would be spaced over a period of several years as funding becomes available (Table 2-6). Therefore, the total area of disturbance at any given time during construction would be much less than 92 ac. (37 ha).

Annual grass/forb, bunchgrass, and open-low shrub communities would be affected based on 1997 mapping data. Biological soil crust would also be affected. Surveys would be conducted during the project design phase to identify existing vegetation communities and evaluate habitat quality. This information would be used during project design to support micrositing decisions. Micrositing would involve looking at proposed construction sites at a “micro” level to identify sensitive features that should be avoided to the extent practicable. Areas of higher quality habitat (e.g., undisturbed areas with a relatively high percentage of native plant cover) would be avoided in favor of areas of lower quality habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent practicable. The survey data would also be used to support post-construction restoration efforts (Appendix F, Additional Biological Information).

As noted above, approximately 49 ac. (20 ha) would be permanently converted to development. Vegetation in these areas would be permanently lost. The area of permanently lost vegetation would be small relative to the total land area at NWSTF Boardman (about 0.1 percent). Approximately 30 ac. (12 ha) temporarily disturbed during construction would be revegetated in accordance with the proposed post-construction restoration plan, which includes provisions for biological soil crust inoculation (Appendix F, Additional Biological Information).

Two special status plant species, stalked-pod milk vetch and Columbia milk vetch (Table 3.5-3), are expected to occur within portions of the area of disturbance and some plants would be lost as a result of construction. These species were common and widespread across NWSTF Boardman in the 2003 to 2004 plant surveys. For each of these species, the surveyors consider their occurrence at NWSTF Boardman as one population as opposed to several separate populations (U.S. Department of the Navy 2004). While the numbers of individual plants that would be lost cannot be estimated based on available data, the total area of disturbance for construction represents very small part of the habitat occupied by these species. Construction activities would not affect the viability of special status plant populations at NWSTF Boardman.

Restoration of disturbed areas in arid or semi-arid environments can be challenging, particularly in locations with established invasive plant populations. Accordingly, the post-construction restoration plan (Appendix F, Additional Biological Information) has been developed in coordination with USFWS, Oregon Department of Fish and Wildlife, and other subject matter experts. The restoration plan and impact avoidance measures would be incorporated into project design and specification documents, which would become an enforceable part of the construction contracts. Qualified Navy or Oregon National Guard (ORNG) personnel would conduct construction monitoring and would oversee restoration and long-term monitoring activities.

Construction activities would result in permanent localized effects on vegetation in the form of lost vegetation communities, lost biological soil crust, and lost individual special status plants under Alternative 1. The intensity of the permanent effects would be considered moderate because special status plant species and uncommon plant communities would be affected. The effects would be localized because the area of permanently lost vegetation would be small relative to the total land area at NWSTF Boardman (about 0.1 percent). The overall viability of special status plant populations would not be affected.

Construction activities would also result in short-term localized effects on vegetation in areas that would be temporarily disturbed and restored. The intensity of the short-term effects are considered minor because the area temporarily disturbed would be small relative to the total land area at NWSTF Boardman (less than 0.06 percent) and a post-construction restoration plan (Appendix F, Additional Biological Information) would be implemented. Construction activities would have no significant impacts on vegetation under Alternative 1.

Training Activities

Disturbance regimes associated with training-related activities conducted in the Main Target Area under Alternative 1 would be the same as the No Action Alternative. However, training activities on the proposed new ranges would result in increased ground disturbance. Soils and vegetation around targets on the new ranges would be disturbed by non-explosive practice munitions striking the ground and during target maintenance. Some of the areas affected would coincide with areas temporarily disturbed during construction, thus hampering restoration efforts. Large-caliber weapons firing at the proposed Digital Multipurpose Training Range (DMPTR) would result in ground disturbance and destruction of vegetation, most or all of which would have also been disturbed during construction. Similar disturbances would occur around target emplacements on the Multipurpose Machine Gun Range (MPMGR) and eastern Convoy Live Fire Range (CLFR).

Areas disturbed by projectile impacts would likely be colonized by invasive plants. These areas, as well as the other proposed action areas, would be monitored annually pursuant to the *NWSTF Boardman INRMP* to determine the effects of range activities on vegetative structure and composition. Surveys would be performed by qualified personnel. Control of invasive plants would be prioritized within the footprints of the proposed training ranges and along all roads expected to be used during training. Vegetation around highly disturbed target emplacements could be permanently lost, either as a result of persistent disturbance from projectile impacts or required vegetation maintenance around the targets.

Vehicle and equipment use would increase substantially under Alternative 1 during ground-based training events. However, vehicles, including tracked vehicles, would continue to use existing roads or new gravel roads constructed under Alternative 1. No off-road maneuver training is proposed.

Training activities under Alternative 1 would result in permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants. The intensity of the permanent effects are considered minor because the area affected would be small relative to the total land area at NWSTF Boardman, the viability of special status plant populations would not be affected, and management practices (MPs) (invasive plant monitoring and control) would be implemented. Training activities would have no significant impacts on vegetation under Alternative 1.

Maintenance Activities

Maintenance activities around targets in the Main Target Area under Alternative 1 would be the same as those described for the No Action Alternative. Approximately 23 ac. (9.3 ha) would continue to be maintained by mechanical disturbance. However, as discussed in Section 3.13 (Wildfire), the *Draft Integrated Wildland Fire Management Plan* (Appendix H) includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created (Figure 3.13-3). The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.

In summary, an overall increase in impacts to vegetation from ground disturbing activities would be observed under Alternative 1 compared to the No Action Alternative when the combined effects of construction, training, and maintenance activities are considered. The total area of disturbance from construction activities would be 92 ac. (37 ha).

Invasive Plants and Weeds

Vegetation communities at NWSTF Boardman would continue to be affected by invasive plants under Alternative 1. Ground disturbing activities described above would continue to indirectly affect native plant communities by creating favorable conditions for establishment of invasive plants and providing pathways for seed dispersal. Disturbance regimes and associated invasive plant impacts in the Main Target Area under Alternative 1 would be similar to the No Action Alternative. Construction and operation of the proposed new ranges would exacerbate existing invasive plant problems. Construction and military vehicles and equipment coming from offsite would provide a new pathway for introduction of invasive plants and would be a dispersal mechanism for seeds at NWSTF Boardman. As discussed in Section 3.5.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures), several MPs would be implemented to avoid invasive plant infestations, monitor invasive plants, and adaptively manage invasive plants during construction and over the life of the proposed training ranges. In addition to project specific MPs, NWSTF Boardman-wide invasive plant and noxious weed management actions would be implemented as part of the *NWSTF Boardman INRMP*. The invasive plant and noxious weed management actions, developed in cooperation with USFWS and Oregon Department of Fish and Wildlife, would be reviewed annually and updated as necessary. Key elements of the plan include the following:

- Standard operating procedures for preventing and minimizing the introduction and spread of invasive plants
- Updates of the invasive plant inventory and mapping prior to implementing the Proposed Action
- Responsibilities and procedures for integrating efforts of the Navy, ORNG, and The Nature Conservancy
- Criteria for prioritizing management actions
- Short- and long-term monitoring programs
- Annual work plans, including funding requirements and funding sources

In addition to the potential adverse effects on vegetation, the proposed increase in use of NWSTF Boardman is expected to result in indirect beneficial effects. As use increases, NWSTF Boardman’s value as a training asset would increase. Range sustainability would become a higher priority as training value rises. As is the case with all government agencies, the Navy and National Guard Bureau make resource allocations and funding decisions based on mission priorities. Therefore, funding for investments in sustainability and conservation would be expected to increase under Alternative 1, resulting in long-term benefits to vegetation through more effective invasive plant management.

Construction and training activities under Alternative 1 would result in indirect long-term effects on vegetation from invasive plants. The effects would be considered long-term and minor with implementation of proposed MPs (Section 3.5.3.4, Proposed Management Practices, Monitoring, and

Mitigation Measures). Invasive plant issues specifically associated with training activities would have no significant impacts on vegetation under Alternative 1.

Training-Related Wildfire

As discussed in Section 3.13 (Wildfire), the proposed increases in training under Alternative 1 at NWSTF Boardman could increase the risk of wildfire. Vegetation communities and special status plants may be impacted through direct mortality (i.e., burning), and subsequent indirect effects such as soil erosion and conversion of native vegetation communities to non-native annual grasslands.

To address these issues, the Navy and ORNG prepared a *Draft Integrated Wildland Fire Management Plan,* which contains a Fire Danger Rating and Wildland Fire Risk Management Matrix, both of which are contained in Appendix H. The Plan would be finalized prior to implementing the Proposed Action and the Navy, ORNG, and other range users would implement the Plan. Specifics regarding implementation of the Plan are provided in Section 3.13 (Wildfire) and Appendix H.

Fires resulting from training activities would be expected to occur on the DMPTR, MPMGR, and eastern CLFR under Alternative 1, particularly during dry periods. However, the area burned is expected to be relatively small based on finalization and implementation of the *Draft Integrated Wildland Fire Management Plan* and the increase in fire suppression assets that would be associated with ORNG training activities. Wildfires would result in short- and long-term effects on vegetation under Alternative 1. The effects would be localized based on finalization and implementation of the *Draft Integrated Wildland Fire Management Plan*. Wildfires caused by training activities under Alternative 1 would have no significant impacts on vegetation.

In summary, NWSTF Boardman is unique because it represents one of the largest remaining single blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia Plateau Ecoregion. Accordingly, the potential impacts on vegetation from ground disturbing activities, invasive plants, and wildfire would be mitigated, monitored, and adaptively managed during construction and over the life of the proposed training ranges. An overall increase in impacts to vegetation from ground disturbing activities would be observed under Alternative 1 compared to the No Action Alternative when the combined effects of construction, training, and maintenance activities are considered. The total area of disturbance from construction activities would be 92 ac. (37 ha). However, proposed modifications to the fire break system could result in restoration of about 219 ac. (89 ha) of disturbed land. The total area of disturbance from construction activities represents a relatively small portion of NWSTF Boardman (0.2 percent). Invasive plants and increased wildfire risk represent potentially significant impacts to native vegetation, but proposed MPs would avoid and minimize impacts. The overall viability of plant populations or plant communities would not be affected. Alternative 1 would have no significant impacts on vegetation.

3.5.3.3 Alternative 2

3.5.3.3.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities

Construction Activities

Site excavation, grading, and equipment operations during construction of the proposed range enhancements for Alternative 2 would result in temporary disturbances to the ground surface (Table 2-5 and Figure 2-9). The area of disturbance for individual construction projects would range from less than 1 to 30 ac. (less than 0.4 to 12 ha). The total area of disturbance would be about 65 ac. (26 ha) (0.1 percent of NWSTF Boardman), 25 ac. (10 ha) of which have been previously disturbed (mostly consisting of existing gravel or dirt roads) (Table 2-5). Approximately 40 ac. (16 ha) of previously undisturbed areas would be affected, about 25 ac. (10 ha) would be permanently converted to development, and about 15 ac. (6 ha) would be temporarily disturbed and revegetated. Construction activities for the range enhancements would be spaced over a period of several years as funding becomes available. Therefore, the total area of disturbance at any given time during construction would be much less than 65 ac. (26 ha).

Under Alternative 2, a second CLFR (western CLFR) would be constructed and the Joint-Use Range Operations Support Center would be constructed as a standalone building. However, the DMPTR would not be constructed under Alternative 2. Therefore, the total area of disturbance for Alternative 2 would decrease 27 ac. (11 ha) compared to Alternative 1 (from 92 ac. [37 ha] to 65 ac. [26 ha]). The area permanently converted to development under Alternative 2 would decrease 25 ac. (10 ha) compared to Alternative 1 (from 50 ac. (20 ha] to 25 ac. [10 ha]). Construction of the western CLFR would include placement of additional gravel on about 12 ac. (4.9 ha) of existing gravel road, but previously undisturbed areas would not be affected. The MPs for Alternative 2 would be the same as those described for Alternative 1.

Construction activities would result in permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants under Alternative 2. Biological soil crust would also be lost. The intensity of the permanent effects would be considered moderate because some of the plant species and plant communities affected are uncommon. The effects would be localized because the area of permanently lost vegetation would be small relative to the total land area at NWSTF Boardman (about 0.05 percent). The overall viability of special status plant populations would not be affected.

Construction activities would also result in short-term localized effects on vegetation in areas that would be temporarily disturbed and restored. The intensity of the short-term effects are considered minor because the area temporarily disturbed would be small relative to the total land area at NWSTF Boardman (about 0.03 percent) and a post-construction restoration plan, which includes provisions for biological soil crust inoculation (Appendix F, Additional Biological Information) would be implemented. Construction activities would have no significant impacts on vegetation under Alternative 2.

Training Activities

As shown in Tables 2-1, 2-2, and 2-3, the training activities conducted under Alternative 2 would be the same as Alternative 1 with three exceptions: (1) the DMPTR would not be constructed, (2) non-explosive practice mortar rounds would be fired into the Main Target Area, and (3) half of the CLFR training events would shift from the eastern CLFR to the western CLFR. These activities would result in a decrease in the area of disturbance associated with training activities compared to Alternative 1. Ground disturbance from use of the mortar firing points would be negligible. Additional vegetation disturbance would occur under Alternative 2 around the target emplacements along the western CLFR, but there would be no disturbance associated with the DMPTR. The MPs for Alternatives 1 and 2 would be the same.

Training activities under Alternative 2 would result in permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants. The intensity of the permanent effects are considered minor because the area affected would be small relative to the total land area at NWSTF Boardman, the viability of special status plant populations would not be affected, and MPs would be implemented. Training activities would have no significant impacts on vegetation under Alternative 2.

Maintenance Activities

Maintenance activities around targets in the Main Target Area under Alternative 2 would be the same as those described for the No Action Alternative and Alternative 1. Approximately 23 ac. (9.3 ha) would continue to be maintained by mechanical disturbance. However, as discussed in Section 3.13 (Wildfire), the *Draft Integrated Wildland Fire Management Plan* (Appendix H) includes proposed modifications to the existing system of fire breaks (Figure 3.13-3). As discussed for Alternative 1, the total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would also decrease from 462 ac. (187 ha) to 243 ac. (98 ha) under Alternative 2. Areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.

In summary, an overall increase in impacts to vegetation from ground disturbing activities would be observed under Alternative 2 compared to the No Action Alternative when the combined effects of construction, training, and maintenance activities are considered. The total area of disturbance from construction activities would be 65 ac. (26 ha).

Invasive Plants and Weeds

As discussed above, ground disturbance associated with construction and training activities under Alternative 2 would decrease compared to Alternative 1 because the DMPTR would not be constructed and operated. The corresponding indirect effects from invasive plants would also decrease. Mortar firing points and the western CLFR would be in use under Alternative 2, but the overall activity footprint would be smaller than Alternative 1. Nonetheless, the activity footprint would be larger than the No Action Alternative and this would provide additional pathways for invasive plant seed dispersal at NWSTF Boardman, thus increasing the potential for infestations. As discussed in Section 3.5.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures), several MPs would be implemented to avoid invasive plant infestations, monitor invasive plants, and adaptively manage invasive plants. The same invasive plant management approach would be used under Alternatives 1 and 2.

Construction and training activities under Alternative 2 would result in indirect long-term effects on vegetation from invasive plants. The effects would be considered long-term, minor, and localized with implementation of proposed MPs discussed in Section 3.5.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures). Invasive plant issues specifically associated with training activities would have no significant impacts on vegetation under Alternative 2.

Training-Related Wildfire

As discussed in Section 3.13 (Wildfire), the proposed increases in training under Alternative 2 at NWSTF Boardman could increase the risk of wildfire, but the risk would be lower than Alternative 1 because the DMPTR would not be constructed and operated.

Fires resulting from training activities would be expected to occur on the MPMGR, and the eastern and western CLFRs under Alternative 2, particularly during dry periods. However, the area burned is expected to be relatively small based on implementation of the *Draft Integrated Wildland Fire Management Plan* (Appendix H). Wildfires would result in short- and long-term effects on vegetation under Alterative 2. The effects would be localized based on implementation of the *Draft Integrated*

Wildland Fire Management Plan. Wildfires caused by training activities under Alternative 2 would have no significant impacts on vegetation.

In summary, NWSTF Boardman is unique because it represents one of the largest remaining single blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia Plateau Ecoregion. Accordingly, the potential impacts on vegetation from ground disturbing activities, invasive plants, and wildfire would be mitigated, monitored, and adaptively managed during construction and over the life of the proposed training ranges. An overall increase in impacts to vegetation from ground disturbing activities would be observed under Alternative 2 compared to the No Action Alternative when the combined effects of construction, training, and maintenance activities are considered. The total area of disturbance from construction activities would be 65 ac. (26 ha). However, proposed modifications to the fire break system could result in restoration of about 219 ac. (89 ha) of disturbed land. The total area of disturbance from construction activities represents a relatively small portion of NWSTF Boardman (about 0.1 percent). Invasive plants and increased wildfire risk represent potentially significant impacts to native vegetation, but proposed MPs would avoid and minimize impacts. The viability of plant populations or plant communities would not be affected. Alternative 2 would have no significant impacts on vegetation.

3.5.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.5.3.4.1 Proposed Management Practices

The current MPs listed in Section 3.5.2.7 (Current Requirements and Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following MPs would be implemented to avoid and minimize potential impacts to vegetation under Alternatives 1 and 2:

- Surveys would be conducted during the project design phase to identify existing vegetation communities and evaluate habitat quality. This information would be used during project design to support micrositing decisions. Areas of higher quality habitat (e.g., undisturbed areas with a relatively high percentage of native plant cover) would be avoided in favor of areas of lower quality habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent practicable. Micrositing efforts would be limited to buildings and structures, as opposed to targetry or other range components, because even minor changes to the range design could affect the associated surface danger zone or impact range safety in other ways. The survey data would also be used to support post-construction restoration efforts.
- Vegetation temporarily disturbed during construction would be restored in accordance with the proposed post-construction restoration plan (Appendix F, Additional Biological Information). The restoration plan would be implemented by the ORNG in accordance with the Host-Tenant Agreement and Inter-Service Support Agreement that would be updated prior to implementing the selected alternative.
- Invasive plants would continue to be managed and controlled under the *NWSTF Boardman INRMP*. The Plan would be updated in cooperation with ORNG, USFWS, and Oregon Department of Fish and Wildlife during routine annual reviews to reflect the evolving invasive plant management situation associated with construction and operation of the new ranges. Updates to the Plan would include provisions for short- and long-term monitoring of invasive plants (see Section 3.5.3.4.2, Proposed Monitoring, below); responsibilities and procedures for integrating efforts of the Navy, ORNG, and The Nature Conservancy; criteria for prioritizing management

actions and adaptive management strategies to control invasive plants; and annual work plans, including funding requirements and funding sources.

- Transport of invasive plant seeds by ORNG vehicles and equipment would be minimized by washing vehicles and equipment before and after training events. Washing would normally occur at the unit's home station.
- The *NWSTF Boardman Draft Integrated Wildland Fire Management Plan* (Appendix H) would be finalized and implemented. In addition to other fire protection measures, the Plan includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created (Figure 3.13-3). The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.
- As part of the *NWSTF Boardman INRMP*, the Navy, in cooperation with The Nature Conservancy, is proposing to relocate RNA-A to a more suitable location. As discussed in Section 3.5.2.6 (Research Natural Areas), three RNAs (A, B, and C, Figure 1-5) were established on NWSTF Boardman in 1978 and are co-managed by The Nature Conservancy under a Memorandum of Understanding with the Navy. The RNA program was created to (1) preserve examples of all significant natural ecosystems for comparison with those influenced by man, (2) provide educational and research areas for ecological and environmental studies, and (3) preserve gene pools of threatened and endangered plants and animals. RNA-A encompasses the Main Target Area at NWSTF Boardman, which must be used and maintained to meet mission requirements. Portions of the Main Target Area are highly disturbed by military use. While the rationale for originally establishing RNA-A within the Main Target Area is uncertain, it has become clear that this area is not functioning as an RNA and is not providing the intended scientific and educational benefits of an RNA. Therefore, the Navy, in coordination with The Nature Conservancy, is proposing to relocate RNA-A to one or more suitable locations on NWSTF Boardman. The new RNA would be sited to avoid possible conflicts with military activities and the new location would be more representative of the unique habitat types RNAs are designed to protect. Similar to existing RNA-B and RNA-C, access to the relocated RNA would normally be limited to research activities, invasive plant control, and emergency response. Vegetation communities would benefit from the increased protection and management provided by relocating RNA-A to a more suitable location.

3.5.3.4.2 Proposed Monitoring

Environmental monitoring involves systematic sampling of physical and biological resources to derive knowledge of the environment, its resources, and processes or activities that affect them. Monitoring can be conducted for a number of purposes, including establishing environmental baselines and trends; informing decision-making for management actions; assessing the effects of natural and human influences; and ensuring compliance with environmental regulations. Accordingly, monitoring is an important component of the Navy's natural resources management strategy implemented under the *NWSTF Boardman INRMP*. The current Plan includes vegetation monitoring project recommendations, which will be implemented subject to the availability of funds properly authorized and appropriated under Federal law.

To the extent possible, vegetation monitoring conducted under the current *NWSTF Boardman INRMP* will be designed to support the Proposed Action, as well as existing management needs. In addition, the Plan would continue to be the primary means of designing and implementing vegetation monitoring to address the evolving management situation associated with construction and operation of the new ranges. Necessary updates to the Plan and associated monitoring would be accomplished during routine annual reviews conducted in cooperation with ORNG, USFWS, and Oregon Department of Fish and Wildlife. This process will help to ensure that a comprehensive and consistent approach to vegetation management and monitoring is accomplished for the entire NWSTF Boardman property.

3.5.3.4.3 Proposed Mitigation Measures

Based on the analysis presented in Section 3.5.3 (Environmental Consequences) and implementation of proposed MPs and monitoring efforts for vegetation, additional mitigation measures are not required to further reduce adverse impacts on vegetation. However, mitigation measures proposed to reduce adverse impacts on the Washington ground squirrel (Section 3.6.3.4, Proposed Management Practices, Monitoring, and Mitigation Measures) would also result in benefits to vegetation communities at NWSTF Boardman. These proposed mitigation measures include restoration of native shrub steppe and grassland habitats at NWSTF Boardman and are described in detail in the USFWS Conference Opinion (Appendix B, Regulatory Correspondence).

3.5.3.5 Summary of Effects and Conclusions

Table 3.5-4 lists each stressor analyzed for potential impacts on vegetation at NWSTF Boardman. The No Action Alternative would not result in significant impacts on vegetation. The analysis indicates that ground disturbance, invasive plants, and wildfires under Alternative 1 and Alternative 2 would not significantly impact vegetation based on implementation of MPs to reduce impacts associated with construction, wildfire, and invasive plants.

Table 3.5-4: Summary of Impacts on Vegetation

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	Not applicable. No construction would occur.
Military Training Activities	No additional loss of vegetation communities or additional direct alteration of habitat. Long-term, minor, and localized effects on vegetation.
Maintenance Activities	No additional loss of vegetation communities or additional direct alteration of habitat. Long-term, minor, and localized effects on vegetation.
Training-related Wildfire	Short- and long-term localized effects on vegetation from fires related to training activities.
Impact Conclusion	The No Action Alternative would not result in significant impacts on vegetation.
Alternative 1	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	Permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants in developed areas. Short-term localized effects on vegetation in areas that would be temporarily disturbed and restored. The effects would be localized because the total area of disturbance would be small relative to the total land area at NWSTF Boardman (0.2 percent). The viability of special status plant populations and native plant communities would not be affected. A post-construction restoration plan (Appendix F, Additional Biological Information) would be implemented.
Military Training Activities	Permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants. The intensity of the permanent effects are considered minor because the area affected would be small relative to the total land area at NWSTF Boardman, the viability of special status plant populations would not be affected, and MPs would be implemented.
Maintenance Activities	Proposed modifications to the fire break system could result in long-term benefits to vegetation communities at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would also reduce the potential for soil erosion and reduce the likelihood of invasive plant infestations.
Invasive Plants	Indirect, long-term, minor, and localized effects with implementation of proposed MPs.
Training-related Wildfire	Short- and long-term effects on vegetation. The effects would be localized based on implementation of the *Draft Integrated Wildland Fire Management Plan*.
Impact Conclusion	Alternative 1 would not result in significant impacts on vegetation based on implementation of MPs to reduce impacts associated with construction, wildfire, and invasive plants.

Table 3.5-4: Summary of Impacts on Vegetation (continued)

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
Alternative 2	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	Permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants in developed areas. Short-term localized effects on vegetation in areas that would be temporarily disturbed and restored. The effects would be localized because the total area of disturbance would be small relative to the total land area at NWSTF Boardman (0.1 percent). The viability of special status plant populations and native plant communities would not be affected. A post-construction restoration plan (Appendix F, Additional Biological Information) would be implemented. The affected area would be smaller than Alternative 1.
Military Training Activities	Permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants. The intensity of the permanent effects are considered minor because the area affected would be small relative to the total land area at NWSTF Boardman, the viability of special status plant populations would not be affected, and MPs would be implemented. The affected area would be smaller than Alternative 1.
Maintenance Activities	Proposed modifications to the fire break system could result in long-term benefits to vegetation communities at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would also reduce the potential for soil erosion and reduce the likelihood of invasive plant infestations.
Invasive Plants	Indirect, long-term, minor, and localized effects with implementation of proposed MPs. The affected area would be smaller than Alternative 1.
Training-related Wildfire	Short- and long-term effects on vegetation. The effects would be localized based on implementation of the *Draft Integrated Wildland Fire Management Plan*. The affected area would be smaller than Alternative 1.
Impact Conclusion	Alternative 2 would not result in significant impacts on vegetation based on implementation of MPs to reduce impacts associated with construction, wildfire, and invasive plants.

Notes: ac. = acres, ha = hectares, MP = management practice, NWSTF = Naval Weapons Systems Training Facility

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3.6 WILDLIFE

3.6.1 INTRODUCTION

3.6.1.1 Overview

This section addresses wildlife resources, including mammals, birds, reptiles, and amphibians. The Study Area for wildlife includes all lands within the Naval Weapons Systems Training Facility (NWSTF) Boardman boundary, as well as areas that lie beneath the existing and proposed NWSTF Boardman special use airspace (SUA) (see Figure 1-2). With the exception of noise, potential direct effects of the Proposed Action to wildlife would be limited to certain areas within the NWSTF Boardman boundary. Accordingly, the analysis focuses on NWSTF Boardman, but also considers the effects of noise on wildlife beneath the existing and proposed SUA and any indirect impacts that might occur outside the boundary.

Much of the land that lies beneath the SUA is agricultural land with little or no native vegetation. While a variety of species use agricultural areas, wildlife habitat of much higher quality is found on tracts of land that support relatively undisturbed native vegetation communities. For example, the Boardman Conservation Area consists of about 22,600 acres (ac.) (9,146 hectares [ha]) of privately owned grassland and shrub-steppe habitat located immediately west of NWSTF Boardman (Figure 3.7-2). The Nature Conservancy has managed this site since 2001 with the objective of protecting and improving native plant communities and their associated wildlife species (Elseroad 2007). In addition, the 17,054 ac. (6,902 ha) United States (U.S.) Army Umatilla Chemical Depot (UCD) lies beneath the proposed Boardman Low Military Operations Area (MOA) (see Figure 2.4-5). Portions of the UCD consist of grasslands and shrub-steppe habitats that support a relatively high degree of native species diversity (U.S. Army 2007).

Twenty-three species of mammals, 81 species of birds, 6 species of reptiles, and 1 amphibian species are known to occur at NWSTF Boardman. The Affected Environment section is organized by these major groups of wildlife. General descriptions are provided for each group, followed by detailed descriptions of any “special status species” in that group. For the purposes of this Environmental Impact Statement (EIS), special status species include:

- Species listed as threatened or endangered under the Endangered Species Act (ESA) of 1973 (16 U.S. Code [U.S.C.] 1531–1543) and species proposed for listing (see Section 3.6.1.2, Regulatory Framework, for descriptions of applicable laws, regulations, and definitions of terms).
- Species considered by the U.S. Fish and Wildlife Service (USFWS) as a candidate for ESA listing.
- Species of concern identified by USFWS. As an informal category not defined by the ESA, the term commonly refers to species that are declining or appear to be in need of conservation. The USFWS Oregon Ecological Services Field Office maintains a list of species of concern (U.S. Fish and Wildlife Service 2014) for the region.
- Birds of conservation concern identified by USFWS for Bird Conservation Region 9 (U.S. Fish and Wildlife Service 2008). The overall goal of this category is to accurately identify those species (beyond those already federally listed as threatened or endangered) in greatest need of conservation action at three different geographic scales (Bird Conservation Regions, USFWS Regions, and national).
- Species classified as threatened or endangered under the Oregon ESA (Oregon Revised Statues 496.171–496.192).
- Species classified as sensitive vulnerable or sensitive critical under Oregon’s Sensitive Species Rule (Oregon Administrative Rules 635-100-040).

The Environmental Consequences section presents an analysis of the potential impacts of the No Action Alternative, Alternative 1, and Alternative 2. For each alternative, the analysis is organized by potential stressors (noise, ground disturbing activities and habitat alteration, physical strikes, electromagnetic radiation, and lasers). The analysis for each stressor begins with an overview of the potential effects on wildlife in general, and then provides more detailed analysis for specific groups of wildlife and special status species, as appropriate.

3.6.1.2 Regulatory Framework

3.6.1.2.1 Endangered Species Act

The ESA established protection over and conservation of threatened and endangered species and the ecosystems on which they depend. An “endangered” species is a species that is in danger of extinction throughout all or a significant portion of its range, while a “threatened” species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. The USFWS and National Marine Fisheries Service (NMFS) administer the ESA. The USFWS has primary responsibility for terrestrial and freshwater species, while the NMFS has primary responsibility for marine species and anadromous fish species (species that migrate from saltwater to freshwater to spawn). No species under NMFS jurisdiction are found on NWSTF Boardman. The ESA allows the designation of geographic areas as critical habitat for threatened or endangered species.

Section 7(a)(1) of the ESA (16 U.S.C. 1536) directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Section 7(a)(2) requires each federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency’s action "is likely to adversely affect" a listed species, that agency is required to consult formally with USFWS or the NMFS, depending upon the species or designated critical habitat that may be affected by the action (50 Code of Federal Regulations [C.F.R.] 402.14(a)). Under the terms of Section 7(b)(4) and Section 7(o)(2) of the ESA, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement. For species that are proposed for listing as endangered or threatened, Section 7(a)(4) of the ESA requires agencies to confer with the USFWS on any agency action that is likely to jeopardize the continued existence of the species.

None of the wildlife or plant species found in the Study Area are currently listed or proposed for listing under ESA. However, the Washington ground squirrel is a candidate species (77 Federal Register [FR] 72449, December 5, 2014). Candidate species are plants and animals for which the USFWS has sufficient information to propose them as endangered or threatened under ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under ESA. As such, consultation under Section 7 of the ESA is not required. However, USFWS encourages cooperative conservation efforts for candidate species because they may warrant future protection under ESA. Federal agencies may voluntarily confer with USFWS to consider effects of their actions on candidate species. Conferences may involve informal discussions between USFWS and the action agency. During the conference, the USFWS may assist the action agency in determining effects and may advise the action agency on ways to avoid or minimize adverse effects to candidate species (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998).

While conferencing for candidate species is not required under ESA, the U.S. Department of the Navy (Navy) and Oregon National Guard (ORNG) determined through the EIS scoping process that it would be appropriate and useful to enter into early conferencing with USFWS regarding the Proposed Action and Washington ground squirrels. This decision was based on the site-specific management situation for the Washington ground squirrel at NWSTF Boardman. The Navy submitted a request for early conferencing to USFWS on April 12, 2012, and USFWS issued a Conference Opinion on December 2, 2013 (Appendix B, Regulatory Correspondence).

The analysis of potential impacts on the Washington ground squirrel presented in this EIS was used to support the conferencing process with USFWS. Therefore, this EIS provides the Navy's determinations of effect for the Washington ground squirrel based on guidance contained in the *Endangered Species Consultation Handbook* (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998). Terms commonly used in making a determination of effect are defined as follows:

- "No effect" is the appropriate conclusion when a species will not be affected, either because the species will not be present or because the project does not have any elements with the potential to affect the species. "No effect" does not include a small effect or an effect that is unlikely to occur.
- "May affect, not likely to adversely affect" means that all effects are beneficial, insignificant, or discountable. Beneficial effects have concurrent positive effects without any adverse effects on the species or habitat (i.e., there cannot be balancing, wherein the benefits of the project would be expected to outweigh the adverse effects). Insignificant effects relate to the magnitude or extent of the impact (i.e., they must be small and would not rise to the level of a take of a species). Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.
- "May affect, likely to adversely affect" means that an adverse effect on listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" determination should be made.

3.6.1.2.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703 et seq.) and the Migratory Bird Conservation Act (16 U.S.C. 715–715d, 715e, 715f–715r) of February 18, 1929 (45 Stat. 1222) are the primary legislation in the United States established to conserve migratory birds. The Migratory Bird Treaty Act prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. The list of species protected by the Migratory Bird Treaty Act appears in Title 50, Section 10.13 of the C.F.R. (50 C.F.R. 10.13) and represents almost all avian families found in North America. With the exception of California quail, European starling, gray partridge, house sparrow, and ring-necked pheasant, all bird species recorded at NWSTF Boardman are protected by the Migratory Bird Treaty Act (U.S. Fish and Wildlife Service 2005).

Pursuant to Executive Order 13186 (January 17, 2001), *Responsibilities of Federal Agencies to Protect Migratory Birds*, the Department of Defense (DoD) and USFWS developed a Memorandum of Understanding to Promote the Conservation of Migratory Birds. The original Memorandum of Understanding was signed in July 2006 and an extension was signed in October 2011. The Memorandum of Understanding describes specific actions that should be taken by DoD to advance migratory bird conservation, avoid or minimize the take of migratory birds, and ensure DoD activities (other than military readiness activities) are consistent with the Migratory Bird Treaty Act. The Memorandum of Understanding also describes how DoD and USFWS will work together cooperatively to achieve these ends. The *NWSTF Boardman Integrated Natural Resources Management Plan* (*INRMP*) (U.S. Department of the Navy 2012) is designed to be in compliance with the requirements of the DoD and USFWS Memorandum of Understanding.

On December 2, 2003, the President signed the 2003 National Defense Authorization Act. The Act provides that the Secretary of the Interior shall exercise his/her authority under the Migratory Bird Treaty Act to prescribe regulations to allow the incidental taking of migratory birds by the Armed Forces during military readiness activities authorized by the Secretary of Defense. Congress defined military readiness activities as all training and operations of the Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Congress further provided that military readiness activities do not include the following:

- The routine operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, morale, welfare, recreation activities, shops, and mess halls
- The operation of industrial activities
- The construction or demolition of facilities used for a purpose described in the previous two bullets

The Final Rule authorizing the DoD to take migratory birds during military readiness activities was published in the Federal Register on February 28, 2007 (50 C.F.R. Part 21). The regulation provides that the Armed Forces must confer and cooperate with USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a “significant adverse effect” on a population of a migratory bird species. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem. As used here, population means a group of distinct, coexisting, conspecific individuals (i.e., organisms of the same species), whose breeding site fidelity, migration routes, and wintering areas are temporally and spatially stable, sufficiently distinct geographically (at some time of the year), and adequately described so that the population can be effectively monitored to discern changes in its status.

3.6.1.2.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (Eagle Act) prohibits killing, selling or otherwise harming eagles, their nests, or eggs. Specifically, the Eagle Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts, nests, or eggs. The Act defines "take" as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb. “Disturb” means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

3.6.1.2.4 Oregon Endangered and Sensitive Species Laws and Regulations

While Oregon's endangered and sensitive species laws and regulations do not apply to any of the current or proposed activities on NWSTF Boardman because it is exclusive federal legislative jurisdiction property, for purposes of National Environmental Policy Act analysis this EIS considers potential effects on species that are classified by the state as endangered, threatened, or sensitive. As discussed above (see Section 3.6.1.1, Overview), these species are collectively referred to as special status species in this EIS, along with species that are federally listed, proposed for listing, or classified as candidates for listing under ESA.

Under state law (Oregon Revised Statues 496.171-496.192) the Fish and Wildlife Commission through the Oregon Department of Fish and Wildlife (ODFW) maintains the list of native wildlife species in Oregon that have been determined to be either threatened or endangered according to criteria set forth by rule (Oregon Revised Statues 635-100-0105). Plant listings are handled through the Oregon Department of Agriculture and most invertebrate listings are handled by the Oregon Biodiversity Information Center. To address the need for a positive, proactive approach to species conservation, a sensitive species classification was created under Oregon's Sensitive Species Rule (Oregon Administrative Rules 635-100-040). The classification of sensitive species helps focus wildlife management and research activities to prevent species from further decline. The state uses the following classification terms:

- **Endangered** – Means an animal threatened with extinction within all or a significant portion of its range.
- **Threatened** – Means an animal that could become endangered within the foreseeable future within all or a portion of its range.
- **Sensitive** – Refers to naturally-reproducing fish and wildlife species, subspecies, or populations that are facing one or more threats to their populations and/or habitats. Implementation of appropriate conservation measures to address the threats may prevent them from declining to the point of qualifying for threatened or endangered status. Sensitive Species are assigned to two subcategories:
    - **Critical sensitive** – Refers to species imperiled with extirpation from a specific geographic area of the state because of small population sizes, habitat loss or degradation, or immediate threats. Critical species may decline to the point of qualifying for threatened or endangered status if conservation actions are not taken.
    - **Vulnerable sensitive** – Refers to species facing one or more threats to their populations or habitats. Vulnerable species are not currently imperiled with extirpation from a specific geographic area or the state but could become so with continued or increased threats to populations or habitats.

3.6.1.3 Determination of Significance

The impact analysis for wildlife considered effects of the Proposed Action on individual animals and populations. The analysis first looked at how individuals would respond to a stressor or combination of stressors and whether the response would affect the fitness of an individual. Fitness refers to changes in an individual's growth, survival, annual reproductive success, or lifetime reproductive success. If individual fitness is not affected, then no impacts on populations would be expected. The potential for impacts to occur at the population level depends on several things, including whether individual fitness has been reduced, the number of individuals affected, the size of the affected population, and numerous life history and ecological factors.

The significance of impacts on wildlife was considered in the context of populations. A population is broadly defined as a group of animals of one species that interbreed and live in the same place at the same time. The geographic scale used to define a particular wildlife population is influenced by species-specific life history characteristics such as migratory and breeding behavior, as well as ecological factors such as habitat availability and barriers to migration or dispersal. These species-specific characteristics and ecological factors are discussed in more detail in Section 3.6.2 (Affected Environment). In particular, impacts on special status wildlife species were considered because populations of these species have declined historically or are currently declining on a regional or national level.

Impacts on wildlife would be determined significant if the fitness of individual animals were affected directly or indirectly to the extent that populations would decline or become unstable. For an outcome to be biologically significant to a population, it must have a measurable impact on the population and/or its habitat, which could reasonably be expected to affect its stability, and as a result influence a population's viability. The scientific limitations associated with predicting the responses of individuals and populations to stressors create a relatively high degree of uncertainty. Accordingly, a conservative approach was used in making significance determinations when the level of uncertainty was considered high.

3.6.2 AFFECTED ENVIRONMENT

3.6.2.1 Mammals

3.6.2.1.1 Overview

At least 22 species of mammals occur on NWSTF Boardman, 20 of which occur year-round and are known to breed on site. Habitats at the facility support 16 small mammal species, 3 ungulate species, 2 omnivorous species of weasels, and 2 carnivorous canids (U.S. Department of the Navy 2012). The mammals at NWSTF Boardman have important ecological roles. For example, top carnivores such as coyotes, badgers, and (to a lesser degree) red foxes, regulate rodent populations, reducing the likelihood of over-consumption of plant material. Table 3.6-1 lists each mammalian species known to occur at the facility, associated habitats, and ecological functions for each major species group. Only one mammal species, the Washington ground squirrel, is considered a special status species (Table 3.6-2) and is described in detail below.

Most of the mammals that occur on NWSTF Boardman are also expected to occur on other undeveloped lands beneath the SUA, with species distribution and abundance being influenced by habitat. In general, areas with relatively intact native plant communities provide the highest quality habitat and areas in active crop production provide lower quality habitat. However, some species such as mule deer may be more abundant in cultivated areas. High quality habitat exists on undeveloped lands immediately west of NWSTF Boardman and on some of the lands beneath the proposed Boardman Low MOA.

Table 3.6-1: Mammal Species Known to Occur at Naval Weapons Systems Training Facility Boardman

Species Group	Species	Habitats	Ecological Function at NWSTF Boardman
Small Mammals	Vagrant shrew	GF, BG, LS, BB, SB, ST, JU, PO	Small mammal species at NWSTF Boardman are primary consumers, foraging on plant material in all habitats at the facility. In this ecological niche, small mammals are the food source for predators, such as the long-tailed weasel, badger, red fox, and coyote, as well as birds of prey and predatory reptiles (snakes). Some small mammals are considered keystone species, where other species throughout the food web are dependent on them. As an example, Washington ground squirrel burrows are utilized by a variety of species, including the western burrowing owl. Burrowing activities reduce soil compaction, aerate soils, and increase water filtration. Small mammals are also important at NWSTF Boardman as an early succession species, re-inhabiting areas after an ecological disturbance, such as wildfires, often spreading vegetation.
	Black-tailed jackrabbit	GF, SB, BB	
	Nuttall's cottontail	GF, SB, JU	
	Washington ground squirrel	GF, SB, BG	
	Northern pocket gopher	GF, BG, LS, BB, SB	
	Great Basin pocket mouse	GF, BG, SB	
	Ord's kangaroo rat	GF, BG, BB, SB	
	Western harvest mouse	GF, BG, BB, SB	
	Deer mouse	GF, BG, LS, BB, SB, ST, JU	
	Northern grasshopper mouse	GF, BG, BB, SB	
	Northern grasshopper mouse	GF, BG, BB, SB	
	Bushy-tailed woodrat	JU, ST	
	Sagebrush vole	GF, SB, JU	
	Montane vole	GF, BG, BB, SB	
	House mouse	ST	
	Porcupine	JU	
Ungulates	Rocky mountain elk[1]	GF, SB	Ungulates graze on various grasses and forbs throughout the facility's habitats. The result is a slowing of succession and maintenance of grasslands. Injured or juvenile ungulates may serve as prey for coyotes.
	Mule deer	GF, SB	
	Pronghorn antelope	GF, SB	
Weasels	Long-tailed weasel	GF, SB, BG	Weasels and badgers prey on various rodent species. Badgers form burrows, which are important for burrowing owls.
	Badger	GF, SB	
Canids	Red fox[1]	GF, BG, LS, BB, SB	As top carnivores, red foxes and coyotes feed on rodents, and may opportunistically feed on sick or unfit ungulates.
	Coyote	GF, BG, LS, BB, SB, JU, PO	

[1] Species likely does not breed on NWSTF Boardman.

Notes: GF = annual grass/forb; BG = bunchgrass; LS = open, low shrub; BB = bitterbrush; SB = sagebrush; ST = human structure; JU = juniper trees; PO = ponds; NWSTF = Naval Weapons System Training Facility

Source: U.S. Department of the Navy 2012

Table 3.6-2: Special Status Wildlife Species Known to Occur or Potentially Occurring at Naval Weapons Systems Training Facility Boardman

Major Taxonomic Group	Species Name		Conservation Status[1]	
	Common	Scientific	Federal	State
Mammals	Washington ground squirrel	*Urocitellus washingtoni*	C	E
Birds	Bald eagle[2]	*Haliaeetus leucocephalus*	BCC	-
	Brewer's sparrow	*Spizella breweri*	BCC	-
	Ferruginous hawk	*Buteo regalis*	SOC BCC	SCR
	Golden eagle	*Aquila chrysaetos*	BCC	-
	Grasshopper sparrow	*Ammodramus savannarum*	-	SV
	Lewis's woodpecker	*Melanerpes lewis*	SOC BCC	
	Loggerhead shrike	*Lanius ludovicianus*	BCC	SV
	Long-billed curlew	*Numenius americanus*	BCC	SV
	Peregrine falcon[2]	*Falco peregrinus*	BCC	SV
	Sage sparrow	*Amphispiza belli*	BCC	SCR
	Sage thrasher	*Oreoscoptes montanus*	BCC	-
	Swainson's hawk	*Buteo swainsoni*	-	SV
	Upland sandpiper[3]	*Bartramia longicauda*	SOC	SCR
	Western burrowing owl	*Athene cunicularia hypugaea*	SOC	SCR
Reptiles	Northern sagebrush lizard	*Sceloporus graciosus*	SOC	SV

[1] See Section 3.6.1.2 (Regulatory Framework) for definition of terms.
[2] Species has not been recorded at NWSTF Boardman.
[3] Only two documented sightings at NWSTF Boardman. Is not expected to breed or regularly occur at NWSTF Boardman.
Notes: C = candidate, BCC = bird of conservation concern in Bird Conservation Region 9, SOC = species of concern, E = endangered, SV = sensitive-vulnerable, SCR = sensitive-critical
Source: U.S. Department of the Navy 2012

3.6.2.1.2 Washington Ground Squirrel

General Description. The Washington ground squirrel is diurnal (active during the day) and spends much of the year (approximately July through December) underground in a state of dormancy called estivation (summer) or hibernation (winter). The annual cycle for this species is summarized in Table 3.6-3.

Washington ground squirrels are ecologically significant for the following reasons (U.S. Fish and Wildlife Service 2012):

- They provide an important prey base for predators such as badgers, ferruginous hawks, and golden eagles.
- Burrowing action reduces soil compaction, loosens and aerates soils, and increases the rate of water infiltration into soil.
- Burrowing increases soil fertility, plant diversity and productivity, and microhabitat diversity by bringing nutrients and buried seeds from deep soil layers to the surface.
- Burrows are reused by many species including snakes, lizards, insects, and burrowing owls.

Table 3.6-3: Washington Ground Squirrel Annual Cycle at Naval Weapons Systems Training Facility Boardman

Activity	Month	Jan				Feb				Mar				Apr				May				Jun				Jul–Dec
	Weeks	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Emergence of adults		■	■																							
Breeding				■	■	■	■	■																		
Emergence of young											■	■	■													
Juvenile dispersal																■	■	■								
Most adult males return to burrows																		■	■							
Most adult females return to burrows																				■	■					
Juveniles return to burrows																							■	■	■	■
Population in estivation/hibernation																										■

Source: Information summarized in Northwest Wildlife Consultants, Inc. (2007)

Status, Population Trends, and Threats. The Washington ground squirrel is a candidate for ESA listing. In their 2013 annual status review, the USFWS re-confirmed that listing of the species is warranted. However, to date, publication of a proposed rule to list the Washington ground squirrel has been precluded by other higher priority listing actions (77 FR 72449, December 5, 2014). The species is listed as endangered by the State of Oregon (Oregon Department of Fish and Wildlife 2011). Although widely abundant historically, recent surveys suggest that its current range has contracted toward the center of its historical range. Approximately two-thirds of the Washington ground squirrel's total historical range has been converted to agricultural and residential uses. NWSTF Boardman and the adjacent privately owned Boardman Conservation Area represent the largest continuous area of occupied habitat in Oregon, and is likely the largest area of contiguous occupied habitat in the entire range of the Washington ground squirrel (U.S. Fish and Wildlife Service 2012).

As discussed below, recent surveys have detected the Washington ground squirrel in new locations within its current range. However, many site vacancies have occurred range-wide, and habitat conversion continues to reduce the amount of available suitable habitat (U.S. Fish and Wildlife Service 2012). Populations appear to fluctuate widely at a local scale. A good estimate of overall population size and population trends are not available due to an overall poor understanding of the species' population dynamics (U.S. Fish and Wildlife Service 2012). Historical and current threats to Washington ground squirrels include the following (U.S. Fish and Wildlife Service 2012):

- Destruction, modification, or curtailment of its habitat or range from agricultural, energy, and other development; non-native plant infestations and associated increases in wildfire frequency; and grazing.
- Historical poisoning and shooting for pest management purposes and recreational shooting.
- Disease, predation, drought, and wildfire.

Distribution. The Washington ground squirrel is endemic to the Columbia Plateau, south and east of the Columbia River and east of the John Day River (Betts 1990). Until recently, the squirrel's range was thought to consist of three clusters of sites, with two in Washington (the Columbia Basin and Badger Mountain) and one in Oregon. The USFWS no longer describes the current range as three clusters of sites based on more recent data. Washington ground squirrel sites have been documented between the Columbia Basin and Badger Mountain clusters, as well as at least two sites near the Oregon and Washington border, well outside the three previously described clusters (U.S. Fish and Wildlife Service 2012).

In Oregon, Washington ground squirrels occur in Gilliam, Morrow, and Umatilla counties, with the population centered primarily on NWSTF Boardman and the adjacent Boardman Conservation Area. Washington ground squirrels are also found on private and Bureau of Land Management (BLM) land west of these properties, on The Nature Conservancy-managed Lindsay Prairie, and on some additional scattered private lands. As of 2012, the ODFW had 705 Washington ground squirrel sites in its database, any one of which could represent an individual, small, or large colony. Fifty-two of these sites were documented between 1938 and 1999, making their current status uncertain. At least 527 of the remaining 653 (80.7 percent) sites occur on the Boardman Conservation Area, NWSTF Boardman, and Lindsay prairie. Eighty sites were discovered during pre-construction and siting surveys for transmission and wind projects, and 39 were located on BLM land. The remaining seven sites are locations where genetic samples were taken for a study, at sites that were previously known (U.S. Fish and Wildlife Service 2012).

In Washington, this species occupies sagebrush-steppe and grassland habitat east of the Columbia River in Adams, Douglas, Franklin, Grant, Lincoln, and Walla Walla counties. Most sites occur in Adams, Grant, and Douglas counties. As of 2012, the Washington Natural Heritage Program contained 567 verified Washington ground squirrel polygons (i.e., mapped estimate of areas containing squirrels) and 65 verified point locations in its database, any one of which could constitute an individual, small, or large colony. This database does not include all the detections that were made during a 2009–2010 survey in the Odessa area. Sites from the Oregon and Washington databases are not directly comparable because a number of factors collectively create a degree of variability and uncertainty in the use of naming conventions to describe areas used by Washington ground squirrels (U.S. Fish and Wildlife Service 2012).

Habitat. The Washington ground squirrel occurs in shrub-steppe and grassland habitat. It is primarily associated with sagebrush and bluebunch-wheatgrass habitats, although cheatgrass and rabbitbrush have replaced much of the native vegetation within its current range. The Washington ground squirrel occupies sites with sandy or silt-loam texture soils that are deep and supportive enough to accommodate its burrow structures. This species seldom constructs burrows in areas of heavily disturbed soils, such as areas affected by plowing, disking, and crop production (U.S. Fish and Wildlife Service 2012). Habitats that provide a more stable food source during droughts appear to be important for these squirrels (U.S. Fish and Wildlife Service 2012).

Occurrence in the Study Area. Several Washington ground squirrel surveys and research studies have been conducted at NWSTF Boardman. Several characteristics of the squirrel make studying them a challenge, including the short periods when they occur above ground, a tendency for male dispersal and short-term population fluctuations. These factors and inconsistencies among researchers have led to some uncertainty and variability in the use of terms to describe areas used by Washington ground squirrels. There is not a clear definition of what constitutes a single colony for this species, and terms such as site, patch, detection, and occurrence have been used to describe what might be called a colony (U.S. Fish and Wildlife Service 2012). The U.S. Fish and Wildlife Service (2012) hopes to eventually bring a standardized convention to describing squirrel populations.

While various survey methods and terms have been used at NWSTF Boardman, most surveys followed standard protocols (Morgan and Nugent 1999) focused on documenting Washington ground squirrel “active detections.” This approach determines if squirrels are using a specific area based on sighting squirrels, hearing squirrel calls, and finding holes recently used by squirrels as determined by the presence of the current year’s droppings (Northwest Wildlife Consultants 2005, 2006; Marr 2001). These surveys are not designed to estimate population size or density (i.e., number of animals per ac. or ha). Furthermore, this approach does not make a distinction between a colony, an active site, an active hole, or an individual squirrel that is part of a colony or a lone disperser. Large portions of NWSTF Boardman have been surveyed since 1979, but a systematic Washington ground squirrel survey of the entire property has not been conducted.

Figure 3.6-1 provides a compilation of known Washington ground squirrel detections at NWSTF Boardman from surveys conducted through 2009. The points shown in Figure 3.6-1 indicate locations where squirrels have been present in the past and are part of regular survey efforts. In some cases, the locations represent colonies. In other cases, they represent only an incidental sighting, where there may or may not be a colony (U.S. Department of the Navy 2012). For some of the surveys conducted at NWSTF Boardman, detections were classified as small, medium, or large colonies or sites based on Morgan and Nugent (1999). However, these classifications were not recorded for all detections across all surveys. Consequently, Figure 3.6-1 makes no distinction based on colony or site size.

As noted above, a systematic Washington ground squirrel survey of the entire property has not been conducted. Many surveys focused on long-term monitoring points where squirrels had been detected in the past. Therefore, the distribution of squirrel detections shown in Figure 3.6-1 is influenced by monitoring effort. While dense clusters of detections indicate areas that have been occupied over time, it is also possible that monitoring effort in these areas was higher. The distribution of squirrel detections would likely be different if equal survey effort had been applied throughout the property on a consistent basis. Therefore, the available data cannot be used to draw definitive conclusions about relative squirrel activity on various parts of the property or to specifically identify Washington ground squirrel "core areas." A core area is consistently inhabited over many years and has high population densities in most years. At lower ends of a population cycle, which might be related to factors such as precipitation and food availability or quality, squirrels persist in core areas that provide more stable habitat during those less than optimal conditions. Squirrels expand out from core areas when conditions are more optimal.

Although higher concentrations of Washington ground squirrels are said to be associated with Warden Soils (e.g., Greene et al. 2009), definitive studies have not been done to identify core areas or variables that are most important to Washington ground squirrels at NWSTF Boardman. Several variables are changing together and moving south on NWSTF Boardman. The precipitation and productivity appear to be increasing with elevation, while soil particle size is generally decreasing. Yensen (2013) suggests that that productivity is as important, or more important, than soil textures on NWSTF Boardman. Although ground squirrels prefer loams, silts, silt loams and sandy loams, most of the soils on NWSTF Boardman, with the exception of the clay pockets, should be suitable for ground squirrels. Higher productivity should translate into denser, more stable ground squirrel populations irrespective of other variables, and productivity generally increases moving south on NWSTF Boardman (Yensen 2013).

Figure 3.6-2 shows historically occupied Washington ground squirrel habitat at NWSTF Boardman. This historically occupied habitat was mapped by applying a 785-foot (ft.) (239-meter [m]) radius buffer to the known squirrel detections shown in Figure 3.6-1. The buffer distance is based on that used by Morgan and Nugent (1999) to estimate actual use-areas (i.e., the expected area of squirrel movement around a detection site) and represents a known maximum travel distance described by Carlson et al. (1980). As shown in Figure 3.6-2, historically occupied habitat is located on or near the proposed range enhancement sites. Based on the lack of recent, systematic survey data, the entire affected area was assumed to be occupied by Washington ground squirrels for impact assessment and mitigation planning purposes. With the exception of highly disturbed areas such as maintained roads, maintained fire breaks, and excavated area, it is reasonable to assume that all of NWSTF Boardman is suitable Washington ground squirrel habitat, especially during high years of a population cycle.

Surveys conducted in 2005, 2006, and 2008 also documented Washington ground squirrels on the proposed Multipurpose Machine Gun Range (MPMGR) and Digital Multipurpose Training Range (DMPTR) locations (Table 3.6-4) (Northwest Wildlife Consultants, Inc. 2005, 2006, 2008). While numerous detections were recorded in 2005 (211) and 2006 (636), it should be noted that the surveys were conducted in June when squirrel activity is low. It is possible that additional detections would have been recorded if the surveys were conducted during the peak activity period (late March through mid-May). Nonetheless, the results provide further confirmation that Washington ground squirrels use habitats at the proposed DMPTR and MPMGR locations.

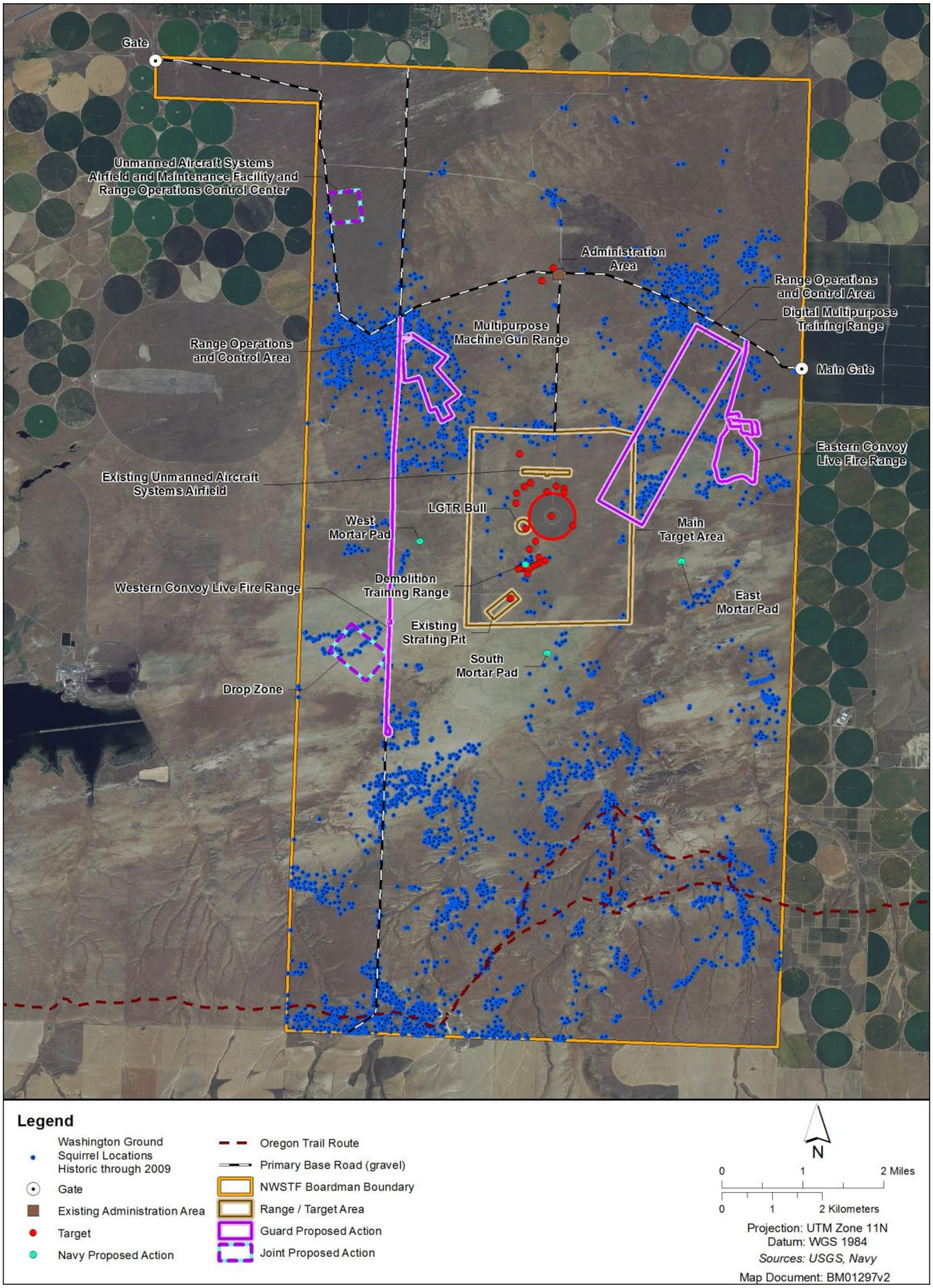

Figure 3.6-1: Known Washington Ground Squirrel Detections at Naval Weapons Systems Training Facility Boardman – Historic through 2009

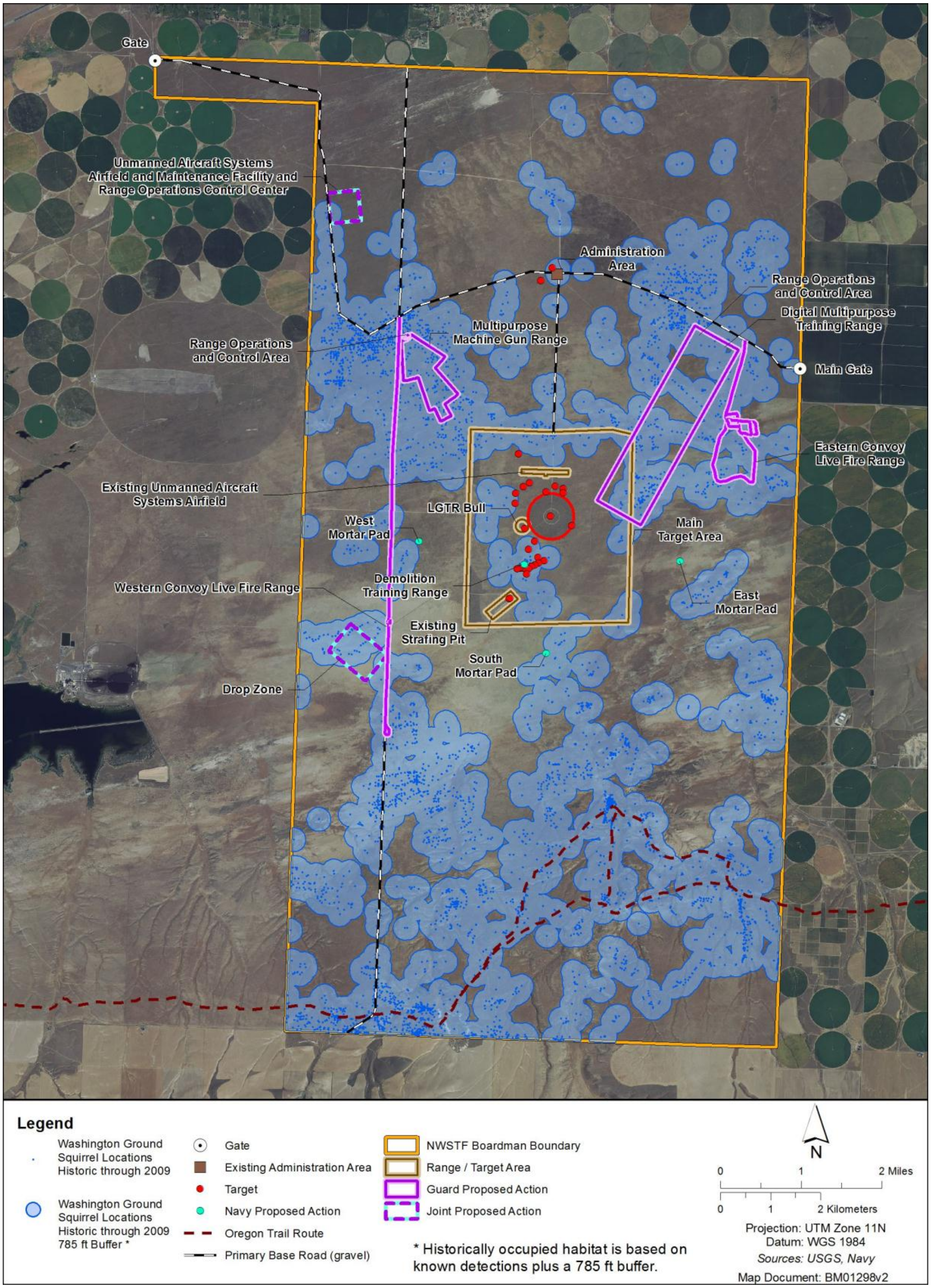

Figure 3.6-2: Historically Occupied Washington Ground Squirrel Habitat at Naval Weapons Systems Training Facility Boardman

Table 3.6-4: Washington Ground Squirrel Surveys Conducted for the Proposed Multipurpose Machine Gun Range and Digital Multipurpose Training Range at Naval Weapons Systems Training Facility Boardman

Survey Date	Location	Area Surveyed (acres [hectares])	Active Detections
June 2005	Northern portions of Multipurpose Machine Gun Range and Digital Multipurpose Training Range	604 (244)	211
June 2006	Multipurpose Machine Gun Range	1,700 (688)	636
March–May 2008	Digital Multipurpose Training Range	2,996 (1,212)	76

Notes: (1) MPMGR = Multipurpose Machine Gun Range, DMPTR = Digital Multipurpose Training Range, NWSTF = Naval Weapons Systems Training Facility; (2) The DMPTR is included in Alternative 1 only.

Source: Northwest Wildlife Consultants, Inc. 2005, 2006, 2008

During the 2008 surveys, only 76 active detections were recorded for the DMPTR location, despite being conducted during the peak activity period and covering a larger area than the 2005 and 2006 surveys. Portions of the 2008 survey area were also surveyed in 2005. In the common survey area, there were 211 active detections in 2005 and only 8 active detections in 2008. Anecdotal observations suggest that the late winter and spring of 2008 received below normal precipitation, and the quality of plants that Washington ground squirrels typically forage on were poor when compared to previous years such as 2005 and 2006. Drought or other factors such as disease or squirrel movements to other areas might explain this change in active detections (Northwest Wildlife Consultants, Inc. 2008).

Three research studies conducted at NWSTF Boardman used mark-recapture methods to estimate Washington ground squirrel density. As shown in Table 3.6-5, density estimates varied substantially and ranged from 0.2 animal per ac. (0.5 per ha) to 36.5 animals per ac. (82.7 per ha). It should be noted that Delavan (2008) and Klein (2005) sampled relatively small study areas known to be occupied by Washington ground squirrels.

To support the overall research objectives (estimate home range, movement, and dispersal), Klein (2005) sampled areas where squirrels were known to be abundant, and Delavan (2008) sampled areas that were expected to support different population sizes (e.g., small, medium, and large). Therefore, density estimates from these studies are not representative of NWSTF Boardman as a whole. Greene et al. (2009) established plots randomly within specific habitat types.

The Washington ground squirrel also occurs at the Boardman Conservation Area and was recently documented along the proposed Carty Lateral Project alignment (Gas Transmission Northwest 2011), portions of which are located beneath the NWSTF Boardman airspace. This species may occur in other areas beneath the airspace where suitable soils exist that have not been converted to agriculture. The Washington ground squirrel has not been documented at UCD (U.S. Army 2007).

Table 3.6-5: Washington Ground Squirrel Density Estimates from Mark-Recapture Surveys

Year	Site Name and Vegetation	Density (animals per acre [hectare])	Reference
1997	Sagebrush 1	6.4 (15.7)	Greene et al. 2009
1997	Sagebrush 2	1.6 (3.9)	Greene et al. 2009
1997	Sagebrush 3	0.5 (1.1)[2]	Greene et al. 2009
1997	Low Shrub 1	1.1 (2.6)	Greene et al. 2009
1997	Low Shrub 1	0.5 (1.2)[2]	Greene et al. 2009
1997	Low Shrub 1	0.2 (0.4)[2]	Greene et al. 2009
1997	Bunchgrass 1	0.5 (1.2)[2]	Greene et al. 2009
1997	Bunchgrass 2	0.2 (0.5)[2]	Greene et al. 2009
1997	Bunchgrass 3	0.8 (2.0)[2]	Greene et al. 2009
2004	Open Low Shrub, open low shrub	4.3 (10.7)	Delavan 2008
2004	Cemetery, annual grass	18.9 (46.6)	Delavan 2008
2004	Large Stipa, bunchgrass[1]	5.2 (12.9)	Delavan 2008
2005	Sage, sagebrush[1]	11.4 (28.1)	Delavan 2008
2002	Tub Springs, annual grass/forbs	33.4 (82.5)	Klein 2005
2003	Tub springs, annual grass/forbs	35.8 (88.4)	Klein 2005
2002	Mystery Road, perennial grass/low shrub	4.5 (11.1)	Klein 2005
2003	Mystery Road, perennial grass/low shrub	8.2 (20.3)	Klein 2005
2002	Cemetery, annual grass, bunchgrass and sagebrush nearby	16.2 (40.0)	Klein 2005
2003	Cemetery, annual grass, bunchgrass and sagebrush nearby	36.5 (90.3)	Klein 2005
2003	Spigot, not described by author	7.2 (17.7)	Klein 2005
	Mean =	9.7 (23.9)	

[1] Site is located on Boardman Conservation Area; all other sites are located on Naval Weapons Systems Training Facility Boardman.
[2] Estimated values interoperated from graph presented by Greene et al. (2009). The authors did not present numeric values for these sites.

3.6.2.2 Birds

3.6.2.2.1 Overview

NWSTF Boardman and its associated airspace are located within Bird Conservation Region 9 (Great Basin). This large (approximately 290,186 square miles [mi.^{2}] [751,578 square kilometers {km^2}]) and complex region includes the Northern Basin and Range, Columbia Plateau, and the eastern slope of the Cascade Range. It spans portions of California, British Columbia, Idaho, Nevada, Oregon, Utah, and Washington. Bird conservation regions have been endorsed by the North American Bird Conservation Initiative as the basic units within which all bird conservation efforts will be planned and evaluated. The North American Bird Conservation Initiative is an endeavor to increase the effectiveness of bird conservation at the continental level and currently includes the United States, Canada, and Mexico. The USFWS has adopted bird conservation regions as the smallest geographic scale at which they identify Birds of Conservation Concern (U.S. North American Bird Conservation Initiative Committee 2000, U.S. Fish and Wildlife Service 2008).

As a large tract of predominately native shrub-steppe and grassland habitats, NWSTF Boardman provides important habitat for a number of bird species. Since 1979, at least 81 species of birds have been recorded, 41 of which nest on site (U.S. Department of the Navy 2012). In 1995, the Navy, Point Reyes Bird Observatory, and ODFW implemented a 3-year inventory and monitoring program of the bird communities found on NWSTF Boardman (Holmes and Geupel 1998). The survey documented the importance of NWSTF Boardman as a breeding area for nine special status species (see Table 3.6-2). A list of birds that have been recorded at NWSTF Boardman is provided in The National Audubon Society has recognized NWSTF Boardman and the adjacent Boardman Conservation Area as the Boardman Grasslands Important Bird Area, which totals approximately 69,000 ac. (27,923 ha). The Important Bird Areas Program is a global effort to identify and conserve areas that are vital to birds and other biodiversity (National Audubon Society 2011).

Holmes and Geupel (1998) reported that sagebrush habitats supported the highest number of species (54) and confirmed breeders (21) at NWSTF Boardman, followed by annual grass/forb (35/8), bitterbrush (33/9), and juniper habitats (27/9). Sagebrush, bitterbrush, and juniper habitats exhibit high structural diversity and, consequently, more niches for different bird species. In general, species diversity was highest in the shrub habitats, while densities of breeding birds were highest in the grassland habitats (Holmes and Geupel 1998). Four species alone (western meadowlark, grasshopper sparrow, horned lark, and long-billed curlew) comprised over 98 percent of the breeding pairs found in grassland and open low shrub (rabbitbrush) habitats (Holmes and Geupel 1998).

Western meadowlarks were the dominant breeding bird in all shrub habitats as well, accounting for 48-77 percent of the sightings (Holmes and Geupel 1998). In grazed sagebrush habitats, lark sparrows were the only other dominant breeder; while in ungrazed sagebrush, grasshopper sparrows and horned larks were dominants. In the upland sagebrush habitats, characteristically different from other sagebrush habitats with its low vegetative groundcover, sage, lark, and grasshopper sparrows joined meadowlarks as dominant breeders (Holmes and Geupel 1998). Meadowlarks, lark sparrows, and Brewer's blackbirds were dominants in the bitterbrush.

As discussed in Section 3.5 (Vegetation), more than 85 percent of NWSTF Boardman has been burned by lightning-caused wildfires since 1998. These wildfires have resulted in short- and long-term habitat alterations, including large decreases in sagebrush cover. Additional bird surveys were conducted in 2000 and 2001 to help determine how the 1998 wildfire (17,514 ac. [7,088 ha]) affected distribution, abundance, and nest success of selected species (Humple and Holmes 2001). Some of the key findings of this study include the following:

- A decrease in sagebrush cover and an increase in cheatgrass cover occurred following the wildfire.
- The number of loggerhead shrike territories decreased from 35 to 40 territories per year before the fire to 17 to 21 afterwards, a change attributed to the loss of suitable nesting habitat. Nest success, already low for the species at 39 percent before the fire, was only 19 percent in 2000–2001.
- Reductions in the extent of sagebrush habitat following the fire also resulted in fewer sage sparrow territories on the facility.
- Abundance of two ground-nesting species, Western meadowlark and lark sparrow, decreased.

Table 3.6-6: List of Birds Observed at Naval Weapons Systems Training Facility Boardman in 1979–2008

Species Name		Habitat and Occurrence								Migratory Behavior
Common	**Scientific**	**GF**	**BG**	**LS**	**BB**	**SB**	**ST**	**JU**	**PO**	
American crow	*Corvus brachyrhynchos*	P		P	P					R
American goldfinch	*Spinus tristis*		P			P				R
American kestrel	*Falco sparverius*					P	CB	P		R
American robin	*Turdus migratorius*					P		P		R
Barn owl	*Tyto alba*	P	P			CB				R
Barn swallow	*Hirundo rustica*	P	P			P	CB			M
Black-billed magpie	*Pica hudsonia*	P	P	P	CB	CB	CB	CB		R
Black-crowned night heron	*Nycticorax*								P	M
Black-throated sparrow	*Amphispiza bilineata*				PB	CB				M
Blue-winged teal	*Anas discors*								P	R
Brewer's blackbird	*Euphagus cyanocephalus*	P			PB	CB			P	R
Brewer's sparrow[1]	***Spizella breweri***					**CB**				**M**
Brown-headed cowbird	*Molothrus ater*	PB	PB	PB	PB	CB			P	M
Bullock's oriole	*Icterus bullockii*				PB			CB		M
Burrowing owl[1]	***Athene cunicularia***	**CB**	**CB**	**PB**	**CB**	**CB**				**M**
California gull	*Larus californicus*	P		P	P					M
California quail	*Callipepla californica*		PB			PB				R
Caspian tern	*Hydroprogne caspia*	P		P	P					M
Chipping sparrow	*Spizella passerina*			P	P	P				M
Chukar	*Alectoris chukar*					PB				R
Cliff swallow	*Petrochelidon pyrrhonota*		P			P				M
Common nighthawk	*Chordeiles minor*	P	PB	P	P	PB				M
Common poorwill	*Phalaenoptilus nuttallii*				P					M
Common raven	*Corvus corax*	P	P	P	P	P	CB	CB		R
Cooper's hawk	*Accipiter cooperii*							P		M
Dark-eyed junco	*Junco hyemalis*					P				M
Eastern kingbird	*Tyrannus*							P		M
European starling	*Sturnus vulgaris*	P				CB	CB	P		R
Ferruginous hawk[1]	***Buteo regalis***	**P**	**P**	**P**		**P**		**CB**		**M**
Fox sparrow	*Passerella iliaca*					P				M
Golden-crowned kinglet	*Regulus satrapa*					P		P		R
Golden eagle[1]	***Aquila chrysaetos***	**P**	**P**	**P**	**P**	**P**		**P**		**R**
Gray flycatcher	*Empidonax wrightii*		P		P	PB		P		M
Gray partridge	*Perdix*			CB	CB	CB				R
Grasshopper sparrow[1]	***Ammodramus savannarum***	**CB**	**CB**	**CB**	**PB**	**CB**				**M**
Horned lark	*Eremophila alpestris*	CB	CB	CB	CB	CB				R
House sparrow	*Passer domesticus*						CB			R
Killdeer	*Charadrius vociferus*	CB							P	M
Lark sparrow	*Chondestes grammacus*			PB	CB	CB				M
Lewis' woodpecker[1]	***Melanerpes lewis***							**P**		**M**
Loggerhead shrike[1]	***Lanius ludovicianus***				**CB**	**CB**		**CB**		**M**
Long-billed curlew[1]	***Numenius americanus***	**CB**	**CB**	**PB**	**PB**	**CB**				**M**
Long-eared owl	*Asio otus*	P	P			CB		CB		R
MacGillivray's warbler	*Geothlypis tolmiei*							P		M
Mallard	*Anas platyrhynchos*	CB							P	M
Merlin	*Falco columbarius*	P				P		P		M
Mountain bluebird	*Sialia currucoides*	P				P				M
Mourning dove	*Zenaida macroura*	P			CB	CB		CB	P	M
Northern flicker	*Colaptes auratus*					P	P	P		R
Northern harrier	*Circus cyaneus*	PB	PB	PB	PB	P		P		R

Table 3.6-6: List of Birds Observed at Naval Weapons Systems Training Facility Boardman in 1979–2008 (continued)

Species Name		Habitat and Occurrence								Migratory Behavior
Common	Scientific	GF	BG	LS	BB	SB	ST	JU	PO	
Northern Pintail	*Anas acuta*	CB								M
Northern rough-winged swallow	*Stelgidopteryx serripennis*					CB				M
Orange-crowned warbler	*Oreothlypis celata*							P		R
Prairie falcon	*Falco mexicanus*	P		P		P				R
Red-tailed hawk	*Buteo jamaicensis*	P	P	P	P					M
Red-winged blackbird	*Agelaius phoeniceus*				P				P	M
Ring-billed gull	*Larus delawarensis*	P								M
Ring-necked pheasant	*Phasianus colchicus*	PB	PB	PB	PB	CB				R
Rock wren	*Salpinctes obsoletus*					PB				R
Rough-legged hawk	*Buteo lagopus*	P	P	P	P	P				M
Sage sparrow[1]	***Amphispiza belli***					**CB**				**M**
Sage thrasher[1]	***Oreoscoptes montanus***				**P**	**CB**				**M**
Say's phoebe	*Sayornis saya*					P				M
Savannah sparrow	*Passerculus sandwichensis*	PB	PB	PB						M
Sharp-shinned hawk	*Accipiter striatus*							P		M
Short-eared owl	*Asio flammeus*	P	CB	P	PB	P				R
Spotted sandpiper	*Actitis macularius*								P	M
Spotted towhee	*Pipilo maculatus*					P		P		M
Swainson's hawk[1]	***Buteo swainsoni***	**P**	**P**	**P**		**P**		**CB**		**M**
Townsend's solitaire	*Myadestes townsendi*					P		P		R
Turkey vulture	*Cathartes aura*					P				M
Upland sandpiper[1]	***Bartramia longicauda***	**P**								**M**
Vesper sparrow	*Pooecetes gramineus*					PB				M
Violet-green swallow	*Tachycineta thalassina*					P				M
Western kingbird	*Tyrannus verticalis*				CB	PB	CB	CB		M
Western meadowlark	*Sturnella neglecta*	CB	CB	CB	CB	CB				R
Western sandpiper	*Calidris mauri*								P	M
Western tanager	*Piranga ludoviciana*							P		M
White-crowned sparrow	*Zonotrichia leucophrys*			P	P	P				M
Wilson's warbler	*Cardellina pusilla*				P					M
Yellow-headed blackbird	*Xanthocephalus*								P	M

[1] Special status species

Notes: GF = annual grass/forb; BG = bunchgrass; LS = open, low shrub; BB = bitterbrush; SB = sagebrush; ST = human structure; PO = ponds; JU = juniper trees; P = present, but does not breed in this habitat; PB = possible or probable breeder; CB = confirmed breeder; R = resident; M = migrant.

Source: U.S. Department of the Navy 2012

The effects of subsequent fires on bird communities at NWSTF Boardman have not been studied. However, these fires caused additional decreases in sagebrush and overall shrub cover. Corresponding changes in use by birds that prefer shrub habitats would be expected. While some sagebrush habitats are starting to recover through natural regrowth of sagebrush, it will take decades before the structural complexity begins to resemble pre-fire conditions.

Other undeveloped lands beneath the NWSTF Boardman airspace that have not been converted to agriculture likely support similar species of birds. For example, 31 bird species were detected on the Boardman Conservation Area during surveys conducted by The Nature Conservancy in 2003, including ferruginous hawk, grasshopper sparrow, long-billed curlew, loggerhead shrike, sage sparrow, and Swainson's hawk (Omdal 2003). These species also occur at UCD (U.S. Army 2007), which is located beneath portions of the proposed Boardman Low MOA. Ferruginous hawk, long-billed curlew, loggerhead shrike, Swainson's hawk, and western burrowing owl have also been observed in the vicinity of the proposed Carty Lateral Project alignment (Gas Transmission Northwest 2011), portions of which are beneath the airspace.

3.6.2.2.2 Special Status Birds and Regional Bird Population Estimates

While the analysis in this EIS addresses all birds in a broad context, additional emphasis is placed on species of concern or special status species (see Section 3.6.1.1, Overview, for definitions of special status species) in accordance with the DoD and USFWS Memorandum of Understanding to Promote the Conservation of Migratory Birds. Table 3.6-7 provides a list of special status bird species that potentially occur at NWSTF Boardman, as well as information about habitat use, occurrence, breeding status, and regional population information. Of the 14 special status species listed in Table 3.6-7, 12 have been recorded on NWSTF Boardman and 9 are confirmed breeders at NWSTF Boardman. The bald eagle and peregrine falcon have not been documented at NWSTF Boardman and suitable nesting habitat for these species is not present. The upland sandpiper has only been sighted twice and is not expected to breed or regularly occur at NWSTF Boardman because the property is on the periphery of its range. While Lewis's woodpecker has been recorded in juniper habitats at NWSTF Boardman, their occurrence is likely transient during migration. The property lacks suitable nesting habitat for Lewis's woodpecker. It is unlikely that the bald eagle, peregrine falcon, upland sandpiper, or Lewis's woodpecker would be exposed to stressors associated with the Proposed Action based on their expected limited use of NWSTF Boardman. Therefore, these species are not addressed in further detail. Descriptions of the remaining special status bird species are provided in the following sections, and Table 3.6-8 provides a summary of seasonal nesting activity for these species.

As discussed in Section 3.6.1.3 (Determination of Significance), the significance of impacts on wildlife was considered in the context of populations. For special status birds, population estimates over a range of geographic scales (Table 3.6-7) were used to consider the context of potential impacts. The geographic scales selected for use were based on existing ecological classifications and boundaries commonly used and accepted by the scientific community, species-specific life history information, availability of population data, and input from USFWS.

Bird conservation regions have been endorsed by the North American Bird Conservation Initiative as the basic units within which all bird conservation efforts will be planned and evaluated. In addition, USFWS has adopted bird conservation regions as the smallest geographic scale at which they identify birds of conservation concern. However, use of bird population estimates at the bird conservation region scale might not adequately consider potential impacts on regionally or locally important bird resources addressed in this EIS, particularly given the large size (approximately 290,186 $mi.^2$ [751,578 km^2])and complexity of Bird Conservation Region 9. Therefore, the portion of Bird Conservation Region 9 that is located within Oregon and Washington (approximately 82,556 $mi.^2$ [213,818 km^2]) was selected as the largest area for consideration of regional bird populations. This area makes up approximately 28 percent of Bird Conservation Region 9 and population data are available from the Partners in Flight Landbird Population Estimates Database (Blancher et al. 2007, Partners in Flight 2012). Bird population estimates for this area have been used by others to represent bird populations in the Columbia Plateau Ecoregion. For example, Johnson and Erickson (2011) recently used population estimates from Bird Conservation Region 9 in Oregon and Washington for their cumulative impacts analysis of wind energy development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. However, it should be noted that Bird Conservation Region 9 within Oregon and Washington covers a larger area than the Columbia Plateau Ecoregion. Other geographic scales selected for use include the portion of Bird Conservation

Region 9 in Oregon (approximately 44,375 mi.^{2} [114,932 km^2]) and the Columbia Basin Ecological Province (approximately 5,078 mi.^{2} [13,152 km^2]) within Oregon as defined by Anderson et al. (1997).

With a few exceptions, the regional avian population estimates and trends used in this EIS are based on data from the North American Breeding Bird Survey. Regional population estimates were obtained from the Partners in Flight Population Estimates Database (Blancher et al. 2007, Partners in Flight 2012) and trend data were obtained from Sauer et al. (2011), both of which rely on North American Breeding Bird Survey data. As is the case with any regional population data, the North American Breeding Bird Survey data have limitations (Blancher et al. 2007, Sauer et al. 2011), but represent the best available data.

Table 3.6-7: Occurrence, Breeding Status, and Regional Population Data for Special Status Birds Potentially Occurring at Naval Weapons Systems Training Facility Boardman

Common Name	Occurrence and Breeding Status at NWSTF Boardman[1]	Regional Population Estimates[2]			Oregon Population Trends[3]	
		BCR 9-OR and WA	BCR 9-OR	Columbia Basin	1966–2010	2000–2010
Bald eagle	Winter reports of occurrence have not been confirmed. Possible transient species, limited foraging and no nesting habitat.	1,400	1,100	126	+5%	+6%
Brewer's sparrow	Confirmed breeder in sagebrush habitats. Ground-nester.	1,640,00	1,500,000	171,649	-2.4%	-2.1%
Ferruginous hawk	Confirmed breeder in juniper habitats. Tree- or platform-nester. Forages in annual grass/forb, bunchgrass, open low shrub, sagebrush, and juniper habitats.	1,000	800	92	+0.7%	+1.1%
Golden eagle	Mostly non-breeding immatures occur year-round at NWSTF Boardman, especially in the vicinity of Juniper Canyon. Very limited nesting habitat on NWSTF Boardman, but confirmed nesting at Boardman Conservation Area. Tree-nester.	1,770	1,700	195	+0.4%	+0.2%
Grasshopper sparrow	Confirmed breeder in annual grass/forb, bunchgrass, open low shrub, and sagebrush habitats. Probable breeder in bitterbrush habitats. Ground-nester.	149,000	9,000	9,000	0%	+0.1%
Lewis's woodpecker	Recorded in juniper habitats, but does not breed in this habitat or other habitats at NWSTF Boardman. Cavity-nester.	25,000	5,000	572	-3.2%	-2.4%
Loggerhead shrike	Confirmed breeder in open low shrub, bitterbrush, and sagebrush habitats. Shrub- or tree-nester.	54,000	40,000	4,577	+1.1%	+1.8%
Long-billed curlew	Confirmed breeder in annual grass/forb, bunchgrass, and sagebrush habitats. Probable breeder in open low shrub and bitterbrush habitats. Ground-nester.	15,823[4]	8,505[4]	973[4]	+2.8%	+2.4%
Peregrine Falcon	Possible transient species, but not recorded at NWSTF Boardman. Cliff-nester.	n/a	30	3	+25.3	+26.5
Sage sparrow	Confirmed breeder in sagebrush habitats. Nest placement in or under shrub.	314,000	300,000	34,330	-4.2%	-4.7%
Sage thrasher	Confirmed breeder in sagebrush habitats. Nest placement in shrub or on ground.	1,060,000	1,000,000	114,433	-0.9%	-1.0%
Swainson's hawk	Confirmed breeder in juniper habitats. Tree- or platform-nester. Forages in annual grass/forb; bunchgrass; open, low shrub; sagebrush; and juniper habitats.	10,000	3,000	343	0%	0.1%
Upland sandpiper	Only two documented sighting of this species in grassland habitat. Is not expected to breed or regularly occur at NWSTF Boardman.	n/a	n/a	n/a	n/a	n/a
Western burrowing owl	Confirmed breeder in annual grass/forb, bunchgrass, bitterbrush, and sagebrush habitats. Probable breeder in open low shrub habitats. Burrow-nester.	10,000	7,000	801	-1.0%	+0.1%

[1] Source: U.S. Department of the Navy 2012

[2] Based on North American Breeding Bird Survey Data obtained from the Partners in Flight Landbird Population Estimates Database (Partners in Flight 2012). BCR 9-OR and WA = Portion of Bird Conservation Region 9 located in Oregon and Washington. BCR 9-OR = Portion of Bird Conservation Region 9 located in Oregon. Columbia Basin = Columbia Basin Ecological Province as defined by Anderson et al. (1997). The Partners in Flight Database does not provide data specific to the Columbia Basin Ecological Province. The Columbia Basin makes up 11.44 percent of BCR 9-OR; therefore, the Columbia Basin population estimate was calculated as 11.44 percent of the BCR 9-OR estimate, with the exception of grasshopper sparrow. Breeding bird survey distribution data indicate that grasshopper sparrow breeding in Oregon is concentrated in or near the Columbia Basin. Therefore, the Columbia Basin population estimate for grasshopper sparrow was assumed to be equal to BCR 9-OR.

[3] Trends are based on Breeding Bird Survey Data for Oregon presented by Sauer et al. (2011). Values are yearly percentage change in population size for the give time periods (1966–2010 or 2000–2010).

[4] Based on the area of each region and long-billed curlew density data presented in Jones et al. (2008) for Bird Conservation Region 9. n/a = Not available, area is outside or on the periphery of species typical breeding range.

Note: NWSTF = Naval Weapons Systems Training Facility

Table 3.6-8: Summary of Nesting Activity for Special Status Birds that Breed at Naval Weapons Systems Training Facility Boardman

Species	Breeding Habitat	Breeding Activity[1]											
		January	February	March	April	May	June	July	August	September	October	November	December
Brewer's sparrow (*Spizella breweri*)													
Territory establishment	SB				■								
Nesting					■	■	■	■					
Typical fledging								■	■				
Ferruginous hawk (*Buteo regalis)*													
Territory establishment	JU			■									
Nesting					■	■							
Typical fledging						■	■	■					
Grasshopper sparrow (*Ammodramus savannarum)*													
Territory establishment	GF, BG, LS, BB, SB					■							
Nesting						■	■	■					
Typical fledging							■	■	■				
Loggerhead shrike *(Lanius ludovicianus)*													
Territory establishment	BB, SB, JU		■	■	■	■							
Nesting				■	■	■	■						
Typical fledging						■	■	■	■				
Long-billed curlew *(Numenius americanus)*													
Territory establishment	GF, BG, LS, BB, SB			■	■								
Nesting						■							
Typical fledging							■	■					
Sage sparrow *(Amphispiza belli)*													
Territory establishment	SB			■									
Nesting					■	■							
Typical fledging							■	■					
Sage thrasher (*Oreoscoptes montanus*)													
Territory establishment	SB			■	■								
Nesting					■	■	■						
Typical fledging							■	■	■				
Swainson's hawk *(Buteo swainsoni)*													
Territory establishment	JU				■	■							
Nesting						■	■	■					
Typical fledging							■	■	■				
Western burrowing owl (*Athene cunicularia hypugaea)*													
Territory establishment	GF, BG, BB, SB			■	■								
Nesting					■	■	■						
Typical fledging							■	■					

[1] Typical breeding activity occurs in the highlighted month.
Notes: GF = annual grass/forb; BG = bunchgrass; LS = open, low shrub; BB = bitterbrush; SB = sagebrush; JU = juniper trees

Long-billed curlew data are based on range-wide surveys conducted in 2004 and 2005 (Jones et al. 2008).The Partners in Flight Database provides species-specific population estimates at four geographic scales: (1) continental, (2) bird conservation region, (3) state, and (4) portion of a bird conservation region within a specific state. Table 3.6-7 provides regional population estimates for three geographic scales, with the largest area being the portion of Bird Conservation Region 9 that is located within Oregon and Washington. The Partners in Flight Database outputs for Bird Conservation Region 9 in Oregon and Bird Conservation Region 9 in Washington were summed to derive these regional population estimates. Table 3.6-7 also provides population estimates for the portion of Bird Conservation Region 9 within Oregon and for the Columbia Basin Ecological Province. The data for Bird Conservation Region 9 in Oregon were obtained directly from the Partners in Flight Database, but the database does not provide specific data for the Columbia Plateau Ecological Province. The Columbia Basin makes up 11.44 percent of Bird Conservation Region 9 in Oregon; therefore, the Columbia Basin population estimates were calculated as 11.44 percent of the Bird Conservation Region 9 in Oregon estimate.

3.6.2.2.3 Brewer's Sparrow

General Description and Habitat. The Brewer's sparrow (*Spizella breweri*) is a sagebrush obligate that is often the most abundant songbird in sagebrush shrub steppe habitats in some regions. It prefers to nest in large, living sagebrush and primarily forages on the ground for insects during the summer and seeds in the winter. Brewer's sparrows will produce replacement clutches when a nest fails, and they frequently double-brood. Renesting begins soon after the loss of the first nest. Second broods are initiated approximately 10 days after the first brood fledges (Holmes and Johnson 2005).

Distribution. Brewer's sparrow is concentrated in the Great Basin, breeding across portions of western Canada and southwestern North Dakota, south to southern California, southern Nevada, central Arizona, and northwestern New Mexico. This species winters from portions of southwestern U.S., south to southern Baja California and central mainland of Mexico (Holmes and Johnson 2005).

Status, Population Trends, and Threats. The Brewer's sparrow is a bird of conservation concern in Bird Conservation Region 9. It has a large population in the region, but a decreasing population trend in Oregon (see Table 3.6-7). Threats include loss of sagebrush nesting habitat to agriculture and wildfire related to cheatgrass invasions (Holmes and Johnson 2005).

Occurrence in the Study Area. Brewer's sparrows are confirmed breeders in sagebrush habitat at NWSTF Boardman, but were extremely rare and local during surveys conducted in 1995–1997. Three territories were located near the southeastern corner of NWSTF Boardman in 1996 and the same three territories were occupied in 1997 (Holmes and Geupel 1998). Suitable nesting habitat for this species has decreased at NWSTF Boardman as a result of wildfire since these surveys were completed. Brewer's sparrows are not expected to nest in the vicinity of the proposed range enhancements based on the lack of sagebrush habitat in these areas. This species may occur in other areas of sagebrush habitat beneath the NWSTF Boardman SUA. Suitable nesting habitat likely exists on the Boardman Conservation Area, but Brewer's sparrows were not recorded there during breeding bird surveys conducted in 2003 (Omdal 2003). This species has been observed on or in the immediate vicinity of UCD (U.S. Army 2007), which is located beneath the proposed Boardman Low MOA.

3.6.2.2.4 Golden Eagle

General Description and Habitat. The golden eagle (*Aquila chrysaetos*) typically occupies open canyon land, desert, grassland, and shrub habitat where their preferred prey, small mammals, can be found. Nest sites are most often on cliffs or bluffs, less often in trees, and occasionally on the ground. Pairs establish and defend breeding territories that may contain multiple nests built or maintained by the pair, which are often reused or attended in subsequent nesting seasons. Individual eagle nests left unused for a number of years may be reoccupied (U.S. Fish and Wildlife Service 2009).

Distribution. In western North America, breeding occurs from western and northern Alaska eastward through Northwest Territories to Labrador, and south to northern Mexico, Texas, western Oklahoma, and western Kansas. The winter range in North America extends from south-central Alaska and southern Canada southward through the breeding range, and casually farther southward. In the United States, the species is most numerous in winter in the Rocky Mountain states, Great Basin, and western edge of the Great Plains (NatureServe 2012).

Status, Population Trends, and Threats. The golden eagle is a bird of conservation concern in Bird Conservation Region 9. Statewide minimum population size and productivity estimates were 481 occupied breeding areas and 457 young in Oregon during 2011 (Isaacs 2012). Breeding bird survey data suggest a stable or increasing population trend in Oregon (see Table 3.6-8). Potential threats include loss of foraging habitat, ingestion of toxics, and interactions with power lines and wind turbines (NatureServe 2012).

Occurrence in the Study Area. Golden eagles, mostly non-breeding immatures, occur year-round at NWSTF Boardman, especially in the vicinity of Juniper Canyon. Immature golden eagles are generally excluded from breeding territories (Steenhof et al. 1983); thus, the lack of a breeding territory on the facility probably accounts for the high use by immature birds. Golden eagles are expected to forage throughout NWSTF Boardman as well as other non-agricultural areas beneath the SUA. Golden eagles have nested at the Boardman Conservation Area and likely forage in undeveloped open areas beneath the proposed Boardman Low MOA. Three occupied golden eagle nests were recorded in Morrow County in 2011, but none were successful (Isaacs 2012).

3.6.2.2.5 Grasshopper Sparrow

General Description. The grasshopper sparrow (*Ammodramus savannarum*) is a bird of open grasslands and prairies. It nests and forages on the ground, primarily feeding on insects and spiders during the breeding season. In winter, this sparrow species feeds on seeds and grains, and occasionally on earthworms and snails.

Status, Population Trends, and Threats. The grasshopper sparrow is classified as sensitive vulnerable in Oregon. It has a wide range, extremely large population, and is common in many areas. However, grasshopper sparrows are thought to be declining throughout their range from habitat loss, fragmentation, and degradation.

Distribution. Grasshopper sparrows winter in the southern United States and Mexico. Most summer breeding habitats are associated with areas west of the Rocky Mountains, but breeding areas extend into shrub-steppes of Oregon, Washington, southern Idaho, and Montana.

Habitat. Throughout its breeding range, grasshopper sparrows are associated with grasslands and prairies with patches of bare ground, and occasionally with agricultural fields.

Occurrence in the Study Area. Grasshopper sparrows occur in all habitats except for juniper woodlands, although Holmes and Geupel (1998) found the grasshopper sparrow to be most strongly associated with bunchgrass habitats. Most nests (36 of 37 nests) found during surveys were constructed at the base of a perennial bunchgrass, and the study concluded that NWSTF Boardman supports a valuable and healthy grasshopper sparrow population where bunchgrass dominates. The Boardman Grasslands Important Bird Area supports what are suspected to be the largest nesting populations in Oregon for the grasshopper sparrow (National Audubon Society 2011). As a migratory species, grasshopper sparrows are only found on NWSTF Boardman generally from May through August. The grasshopper sparrow occurs at the Boardman Conservation Area and UCD, and may occur in other areas of suitable habitat beneath the NWSTF Boardman airspace.

3.6.2.2.6 Sage Sparrow

General Description. The sage sparrow (*Amphispiza belli*) is an early spring migrant to NWSTF Boardman and other habitats in the Columbia Basin (Holmes and Geupel 1998).

Status, Population Trends, and Threats. The sage sparrow is classified as sensitive critical in the Columbia Plateau Ecoregion in Oregon. Increased development and destruction of shrub-steppe habitat have contributed to a range-wide decline in the sage sparrow population. Less than 20 percent of the existing steppe area in eastern Oregon and eastern Washington is considered preferred sage sparrow habitat, and much of these habitats are fragmented. Over half of their former habitat has been converted to agriculture. Fires in these areas also contribute to habitat loss. Sage sparrows abandon habitat that has been taken over by cheatgrass, which is a non-native annual grass that has invaded much the region's shrub-steppe habitat and continues to invade recently burned areas.

Distribution. Sage sparrows are known to breed throughout sagebrush landscapes of the Columbia Plateau. Sage sparrows in Oregon and Washington are migratory, spending the winter in southern deserts. They are one of the earliest songbird migrants; many arrive before March. They are typically gone by mid-September.

Habitat. Sage sparrows are restricted to open shrublands and grasslands. They can be found foraging in small flocks starting in late June. Most of their foraging takes place on the ground.

Occurrence in the Study Area. Prior to a series of wildfires starting in 1998, NWSTF Boardman supported approximately 7,400 ac. (2,995 ha) of sagebrush habitat. Sagebrush cover has decreased as a result of wildfire and current sagebrush cover is primarily found in and near Juniper Canyon. Because of the negative correlation of sage sparrow occurrence and cheatgrass invasions, most sage sparrow occurrences are associated with the upland sage areas of the facility. The sage sparrow occurs at the Boardman Conservation Area and UCD, and may occur in other areas of suitable habitat beneath the NWSTF Boardman airspace.

3.6.2.2.7 Sage Thrasher

General Description and Habitat. The sage thrasher (*Oreoscoptes montanus*) is a sagebrush steppe obligate that relies on large expanses of sagebrush steppe for successful breeding. It prefers sagebrush habitats on flat to gently rolling hills. This species tends to select healthy, mature sagebrush in dense stands for nesting, with nests typically placed deep within or under the shrub. Sage thrashers forage on the ground for insects in areas of relatively open understory near the nest site during breeding season, suggesting that a fine-scale habitat mosaic may be needed to support productive nests (Buseck et al. 2004).

Distribution. The sage thrasher occurs in suitable shrub steppe habitat throughout western North America. Its summer breeding range includes isolated areas in Canada and large portions of most western states. This species winters primarily in the southwestern U.S. and Mexico (Buseck et al. 2004).

Status, Population Trends, and Threats. The sage thrasher is a bird of conservation concern in Bird Conservation Region 9. Breeding bird survey data indicate a large population in the region, but suggest a decreasing population trend in Oregon (see Table 3.6-7). Primary threats to this species include habitat loss or degradation from agricultural cultivation, domestic grazing, invasion of exotic plant species, change in fire frequency, fragmentation from energy development, and increased recreational use (Buseck et al. 2004).

Occurrence in the Study Area. Sage sparrows are a confirmed breeder in sagebrush habitat at NWSTF Boardman, but were only documented in low densities during surveys conducted in 1995–1997. One nest was located in 1995, two were located in 1996, and none were located in 1997. Numerous inactive nests from previous years were found during the surveys, suggesting that occurrence of sage thrasher nesting on NWSTF Boardman is variable (Holmes and Geupel 1998). Suitable nesting habitat for this species has decreased at NWSTF Boardman as a result of wildfire since these surveys were completed. Sage thrashers are not expected to nest in the vicinity of the proposed range enhancements based on the lack of sagebrush habitat in these areas. This species may occur in other areas of sagebrush habitat beneath the NWSTF Boardman SUA. Suitable nesting habitat likely exists on the Boardman Conservation Area, but sage thrashers were not recorded there during breeding bird surveys conducted in 2003 (Omdal 2003). Nesting habitat may also exist on undeveloped lands located beneath the proposed Boardman Low MOA.

3.6.2.2.8 Western Burrowing Owl

General Description. The western burrowing owl (*Athene cunicularia hypugaea*) is a grassland specialist distributed throughout western North America, primarily in open areas with short vegetation and bare ground desert, grassland, and shrub-steppe environments.

Status, Population Trends, and Threats. The western burrowing owl is considered a species of concern by USFWS and is classified as sensitive critical in the Columbia Plateau Ecoregion of Oregon. Primary threats across the North American range of the burrowing owl are habitat loss due to land conversions for agricultural and urban development, and habitat degradation and loss due to reductions of burrowing mammal populations. The elimination of burrowing mammals through control programs and habitat loss has been identified as the primary factor responsible for declines of burrowing owls. Additional threats to burrowing owls include habitat fragmentation, predation, illegal shooting, pesticides and other contaminants. The types and significance of threats during migration and wintering are poorly understood (U.S. Fish and Wildlife Service 2009). It should be noted that breeding bird surveys conducted in Oregon and Washington have noted an annual increase of 1.5 percent between 1966 and 1996 (Sauer et al. 2008).

Distribution. The historical range in the United States includes Washington, Oregon, California, Montana, Idaho, Utah, Nevada, Arizona, Wyoming, Colorado, New Mexico, North Dakota, South Dakota, Nebraska, Kansas, western portions of Oklahoma, Minnesota, Iowa, and most of west Texas. The breeding range has contracted primarily on the eastern and northern edges (Wellicome and Holroyd 2001).

Habitat. Optimum habitat includes open areas with short vegetation and an abundance of small mammal burrows (Paige 1998).

Occurrence in the Study Area. The burrowing owl is the most common owl found on the facility with 71 nesting attempts recorded in 1997 (Holmes and Geupel 1998). These nests are shown in Figure 3.6-3.

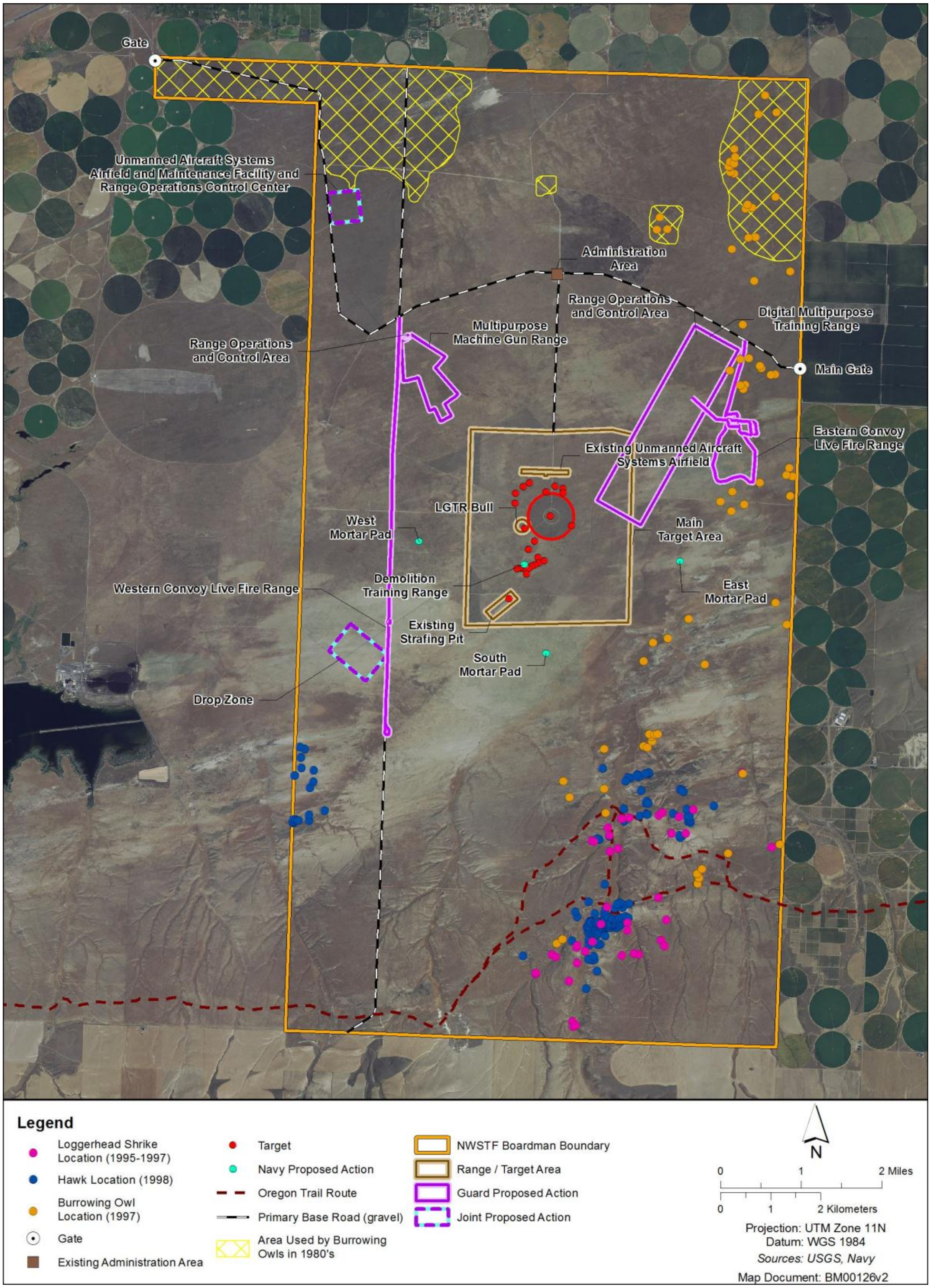

Figure 3.6-3: Nest Locations for Burrowing Owls, Loggerhead Shrikes, and Hawks at Naval Weapons Systems Training Facility Boardman

Green and Anthony (1989) studied burrowing owls on NWSTF Boardman from 1980 to 1981 and found the owls prefer annual grass or open bitterbrush habitats for nesting. Most owl pairs on the facility nested in old badger burrows, and utilized a nearby shrub (dead or alive) for perching. Green and Anthony (1989, 1997) have shown the near dependence of burrowing owls on badgers for providing nesting burrows, despite badgers being the primary predator of owl nestlings. Diet studies by Green et al. (1993) found that while burrowing owls on NWSTF Boardman feed on a wide variety of prey, pocket mice, pocket gophers, crickets, and grasshoppers are the most important prey species.

Green and Anthony (1989) and Holmes and Geupel (1998) found burrowing owl nesting success on NWSTF Boardman to vary between 47 and 65 percent. Adult abandonment was the primary cause of nesting failure, followed by predation (usually badgers), and trampling in of the burrow by livestock. A dramatic increase in badger abundance was noted in 1997. The percentage of nests lost to badgers in 1997 was 29 percent, compared to 0 and 5 percent in 1995 and 1996, respectively. Both studies found moderate to high re-use of burrows still open and available for nesting. The burrowing owl occurs at the Boardman Conservation Area and UCD, and may occur in other areas of suitable habitat beneath the NWSTF Boardman airspace.

3.6.2.2.9 Ferruginous Hawk

General Description. The Oregon and Washington populations of ferruginous hawks (*Buteo regalis*) are migratory, with the majority of birds leaving, although some may remain in the Columbia Basin year-round. They return by early March, and adults may leave as early as July. Juveniles may stay until August.

Status, Population Trends, and Threats. Ferruginous hawks are considered a species of concern by USFWS and are classified as sensitive critical in the Columbia Plateau Ecoregion in Oregon.

Distribution. The ferruginous hawk winters in northern Mexico, the southwestern United States, and California. Breeding occurs from southern Canada to the southwestern United States.

Habitat. Ferruginous hawks inhabit dry, open country of the plains, prairies, grassland, shrub-steppe, and deserts, especially in those areas with native bunchgrasses. Compared to the Swainson's hawk, another raptor associated with grasslands and shrublands at NWSTF Boardman, the ferruginous hawk occurs in drier habitat and is more likely to nest on utility towers, nest platforms, or cliff ledges.

Occurrence in the Study Area. Ferruginous hawks are known to forage in every habitat type at NWSTF Boardman with the exception of bitterbrush habitats. Holmes and Geupel (1998) suspect that the lack of foraging in bitterbrush was not due to habitat quality; rather, bitterbrush habitats were far from nesting locations. Nests are most closely associated with the juniper trees of Juniper Canyon, with some nest sites reported along the western boundary of NWSTF Boardman near Well Springs Canyon (see Figure 3.6-2). The ferruginous hawk occurs at the Boardman Conservation Area and at UCD. However, it is not known to nest at the UCD (U.S. Army 2007).

3.6.2.2.10 Swainson's Hawk

General Description. Swainson's hawks (*Buteo swainsoni*) are a wide-ranging species with large home ranges. Home range size is highly variable, and affected by a number of factors including distribution and location of adjacent nesting foraging habitats, amount of foraging habitat, and prey fluctuations throughout the year (Bechard 1982, Estep 1989). Swainson's hawks mainly hunt mice, ground squirrels, rabbits, birds, and reptiles during the breeding season, and largely live off insects like grasshoppers, locust, and beetles during the non-breeding season (Holmes and Geupel 1998).

Status, Population Trends, and Threats. Swainson's hawks are classified as sensitive vulnerable in Oregon.

Distribution. Wintering in South America, Swainson's hawks breed in the western United States, southern Canada, and northern Mexico throughout spring and summer. Breeding areas include south-central Alberta, central Saskatchewan, southwestern Manitoba, and west and southern Minnesota. They will breed as far north as east-central Alaska, and southwestern Yukon. Breeding continues south through the eastern parts of Washington and Oregon.

Habitat. Swainson's hawks forage in open farmland, sagebrush desert, or prairies. Swainson's hawks inhabit moister areas than ferruginous hawks, and tend to nest in wooded groves along streams, windbreaks, or other treed or brushy areas near open habitats, often building nests in introduced locust or cottonwood trees. During migration they are often found in grasslands and harvested fields.

Occurrence in the Study Area. Swainson's hawks are restricted to the sagebrush and juniper habitats for nesting, but have been observed in adjacent habitats including open low shrublands, bunchgrass habitats, and agricultural fields on adjacent properties. Swainson's hawks arrive in mid-April and begin nest construction within a few days. Juniper trees are considered very important for nest selections (Holmes and Geupel 1998). Nesting sites are located primarily in Juniper Canyon (see Figure 3.6-3) and nesting is not expected to occur at the proposed locations for the new ranges. Swainson's hawks occur at the Boardman Conservation Area and UCD. Two active Swainson's hawk nests were documented near the UCD's administrative area during surveys conducted in 1999 and 2000 (U.S. Army 2007).

3.6.2.2.11 Loggerhead Shrike

General Description. The loggerhead shrike (*Lanius ludovicianus*), a predatory songbird, is a short distance migrant which occupies open country with scattered trees, shrubs, desert scrubland, and occasionally, open woodland (Bartgis 1998). They are often observed perching on poles, wires or fence posts (Bartgis 1992).

Status, Population Trends, and Threats. The loggerhead shrike is classified as sensitive vulnerable in the Blue Mountains, Columbia Plateau, and Eastern Cascades Slopes and Foothills Ecoregions in Oregon. Populations in Columbia Basin have experienced an annual decline of 2.7 percent based on Breeding Bird Survey data from 1968 to 1994 (Saab and Rich 1997), and this downward trend has continued through 2008. This bird has been included on the Audubon Society's Blue list of declining species every year since its creation in 1972 (Tate 1986). Pesticides, loss of nesting habitat, high winter mortality and intensive farming practices have all contributed to declines (Holmes and Geupel 1998).

Distribution. Loggerhead shrikes winter primarily in the southern United States, especially in the Central Valley of California, and also along the Texas coast. They usually arrive in Oregon and Washington in mid-March and leave by mid-September, although a very few birds remain throughout the year. Those that do migrate are short to medium distance migrants.

Habitat. Loggerhead shrikes breed in open landscapes, including grasslands and shrub-steppe areas, where there are scattered trees, tall shrubs, fence posts, utility wires, or other lookout posts. They tend to nest in northeast or southeast facing ravines. Loggerhead shrikes need large territories and are therefore only found in low densities. Observing prey from high perches, shrikes fly swiftly down after prey. The loggerhead shrike is predominantly an insect-eater, especially in the summer when it feeds mainly on grasshoppers. Shrikes occasionally eat small lizards, rodents, and small birds, using their hooked bills to break the necks of vertebrate prey. Because their feet are not large or strong enough to hold prey, shrikes find a crotch in a tree, a thorn, or barbed wire to hang their prey on while they eat. Prey may be left on such a site for later consumption.

Occurrence in the Study Area. Loggerhead shrikes nest primarily in the sagebrush and juniper habitats, as well as bitterbrush areas (see Figure 3.6-3). Holmes and Geupel (1998) report a strong association with Juniper Canyon habitats. Loggerhead shrikes occur at the Boardman Conservation Area and UCD.

3.6.2.2.12 Long-billed Curlew

General Description. Long-billed curlews (*Numenius americanus*) typically arrive on the breeding grounds in late March; eggs are laid during the last two weeks of April and hatching generally occurs during May and early June. Birds arrive as early as March 14 on the breeding grounds at NWSTF Boardman (see Table 3.6-8) (Paulson 1993). Transients to the area move on by May 1 and nesting typically occurs in May with most eggs hatching during the last week of May (Littlefield 1990). This species primarily feeds on invertebrates by probing the ground with its bill.

Status, Population Trends, and Threats. The long-billed curlew is classified as sensitive vulnerable in the Blue Mountains, Columbia Plateau, and Eastern Cascades Slopes and Foothills Ecoregions in Oregon. The Oregon Conservation Strategy identifies the Columbia Plateau and Northern Basin and Range as the highest priority ecoregions in the state to implement conservation actions, particularly conservation of short grass habitats and sub-irrigated meadows. Despite decreases in curlew numbers in most areas in the United States, Breeding Bird Surveys conducted from 1968 to 1994 indicated a 5.1 percent annual increase in observations within the Columbia Basin (Holmes and Geupel 1998). However, the areas around NWSTF Boardman show an annual decrease of less than 1.5 percent from 1966 to 2008 (Sauer et al. 2008).

Distribution. The historical breeding range of long-billed curlews was the western United States, and the southern Canadian Prairie Provinces from California north to British Columbia and east to southern Manitoba and Wisconsin, northern Iowa and eastern Kansas. This breeding distribution has contracted to about 30 percent of their historical range (U.S. Fish and Wildlife Service 2009). The eastern edge of the current breeding range is the western Great Plains from the Texas panhandle north throughout southwestern and south central Saskatchewan. Long-billed curlews currently winter along the southwestern U.S. coast from central California, southern Texas and Louisiana south along both of Mexico’s coasts to Guatemala. Long-billed curlews are locally common east of the Cascade Range during the breeding season, particularly in the Columbia Basin and Northern Basin and Range. Curlews are considered rare along the coast in winter, with limited sightings in Coos Bay and Tillamook Bay.

Habitat. Describing long-billed curlew habitat throughout the current range for this species is complex because of varying requirements for water availability, size of suitable continuous habitats, vegetation structure and composition (U.S. Fish and Wildlife Service 2009, Dechant et al. 2003). In general, long-billed curlews can be expected to avoid trees, tall weedy vegetation, and tall dense shrubs during the breeding season, and will nest in the most open habitat available.

Occurrence in the Study Area. The long-billed curlew is the fourth-most-common bird at NWSTF Boardman during the breeding season (Holmes and Geupel 1998), with an estimated 300–400 pairs nesting here each year (U.S. Department of the Navy 2012). Pampush and Anthony (1993) studied curlews at NWSTF Boardman from 1978 to 1980, and Holmes and Geupel (1998) studied them from 1995 to 1997. Figure 3.6-4 shows the nesting distribution of this bird on the facility based on these surveys.

Both parties found curlew nest densities highest in the annual grass habitats, followed in importance by grazed bunchgrass, open low shrub, and open bitterbrush. Curlew annual nesting success on the facility is varied, ranging between 21 and 88 percent (Pampush and Anthony 1993, Holmes and Geupel 1998). Avian (crows and ravens) and mammalian (coyotes and badgers) predators appear to be equally responsible for most of the curlew nest losses (Holmes and Geupel 1998). Long-billed curlews occur at the Boardman Conservation Area and UCD.

3.6.2.3 Amphibians and Reptiles

3.6.2.3.1 Overview

One amphibian and six reptiles are found at NWSTF Boardman. The amphibian species (Great Basin spadefoot toad [*Spea intermontana*]), occurs primarily in shrub-steppe communities. A variety of aquatic habitats are used for breeding including slow flowing springs, seasonal pools, irrigation ditches, and ponds. Spadefoots are nocturnal and terrestrial, only returning to water for breeding. Spadefoots use intermittent pools of water that develop in Juniper Canyon during wet years as a breeding location and for egg-laying. They are adapted to survive in arid climates by spending long periods of time buried under ground. Great basin spadefoots start breeding in late March in the Columbia Basin (U.S. Department of the Navy 2012).

The six reptiles found at the facility include three lizards (short-horned lizard, side-blotched lizard, and the northern sagebrush lizard) and three snakes (racers, gopher snakes, and western rattlesnakes). These reptile species are generally associated with open grasslands and shrublands. The northern sagebrush lizard is considered a special status species, and is described in more detail below.

3.6.2.3.2 Northern Sagebrush Lizard

General Description. Northern sagebrush lizards (*Sceloporus graciosus graciosus*) typically emerge from hibernation in April and breed in April and May. Females lay eggs in June and hatchlings emerge from the buried nest site in August. Lizards return to hibernation in late September. Sagebrush lizards are sensitive to disturbance during periods of activity, particularly while basking. If approached, lizards dash for cover in rock outcroppings or underbrush (Nussbaum et al. 1983; Storm et al. 1995).

Status, Population Trends, and Threats. The northern sagebrush lizard is considered a species of concern by USFWS and is classified as sensitive vulnerable in the Columbia Plateau Ecoregion in Oregon. The USFWS once considered this species as a candidate for ESA listing; however, the candidate status was removed by the USFWS in 1996. Threats include loss of habitat caused by agriculture, intensive grazing, and other development. Aerial spraying of insecticides may have also affected insect populations, the main diet of northern sagebrush lizards.

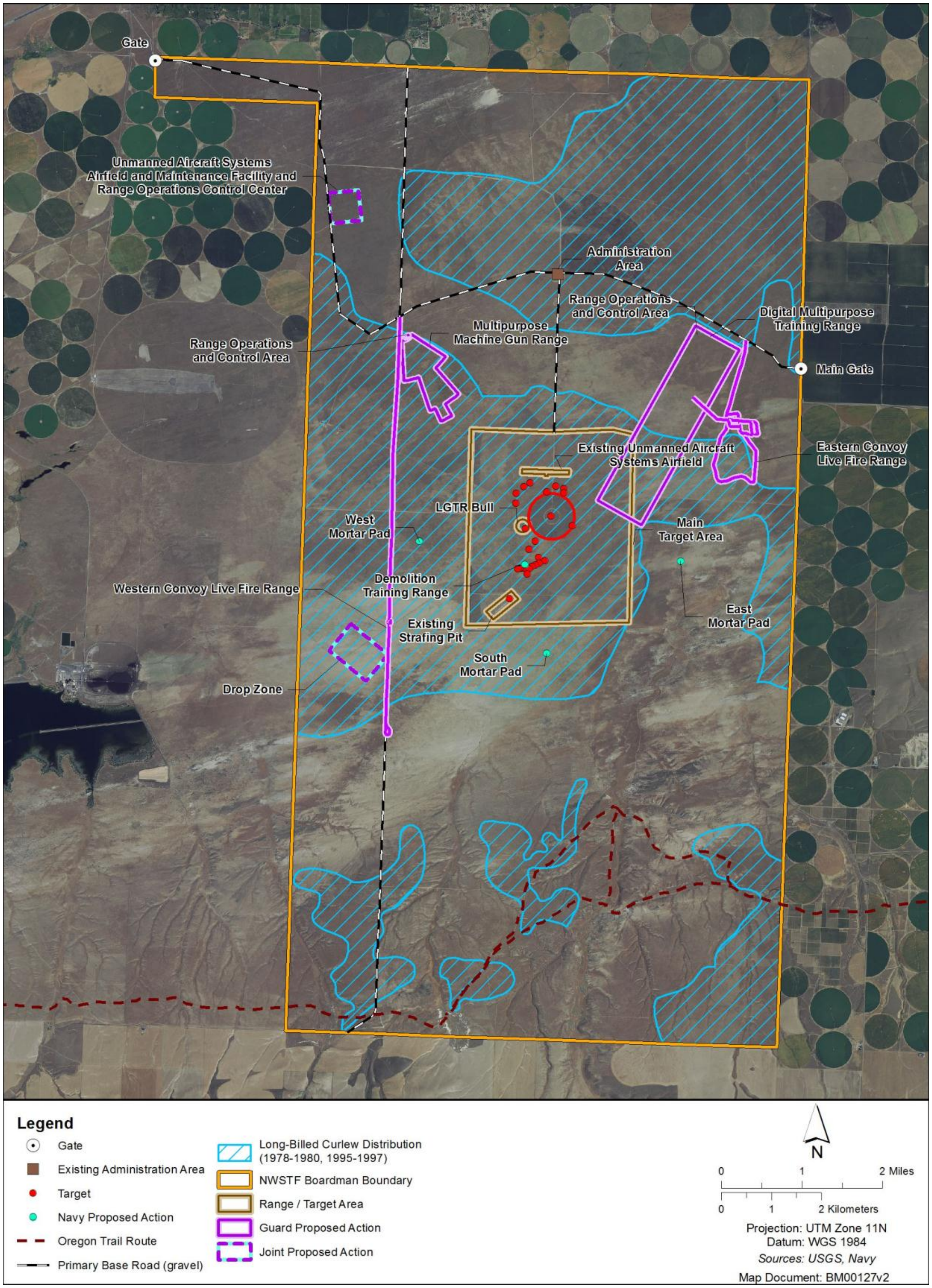

Figure 3.6-4: Long-Billed Curlew Breeding Habitats at Naval Weapons Systems Training Facility Boardman

Distribution. The northern sagebrush lizard distribution includes much of the western United States. They can be found throughout Utah, Nevada, southern Idaho, northern Arizona, northwestern New Mexico, Texas, and western Colorado. They are also widely distributed throughout areas of Wyoming, Oregon, California, and Washington. Isolated populations can be found in North Dakota and Nebraska. The lizard has been found to live at elevations ranging from 500 to 10,500 ft. (153 to 3,200 m).

Habitat. Northern sagebrush lizards prefer sagebrush habitats, but are also found in pine or fir forests, redwood forests, brushland, and piñon-juniper woodland. The northern sagebrush lizard is primarily a ground dweller, which occupies sagebrush and shrub communities with a relatively high percentage of sandy bare ground. This habitat provides both shade and shelter, and is conducive to the lizard's "sit-and-wait" foraging tactic that they use to capture passing prey (Rose 1976). Sagebrush lizards are also known to occupy small rock outcroppings as well as pine forests with an open and brushy under story (Nussbaum et al. 1983).

Occurrence in the Study Area. Northern sagebrush lizards are the most commonly observed and probably the most ecologically important reptile at NWSTF Boardman. Their high population levels provide an abundant food source for predators, including loggerhead shrikes, snakes, and small raptors. Their importance at NWSTF Boardman led to targeting this species for special study in 1995 (Green et al. 1995). The study showed they were found almost exclusively in big sagebrush or bitterbrush shrub communities with a high percentage of sandy bare ground. They largely avoided areas of high grass, litter, and lichen coverage. In general, sagebrush lizards were found where large shrubs covered semi-active dune systems. Figure 3.6-5 shows their distribution. Wildfires at NWSTF Boardman have affected northern sagebrush habitat by decreasing sagebrush and overall shrub cover. Northern sagebrush lizards occur at the Boardman Conservation Area and UCD.

3.6.2.4 Current Requirements and Management Practices

Current requirements and management practices (MPs) applicable to wildlife at NWSTF Boardman are described in the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012). Actions focus on minimizing disturbance and restoring native habitats.

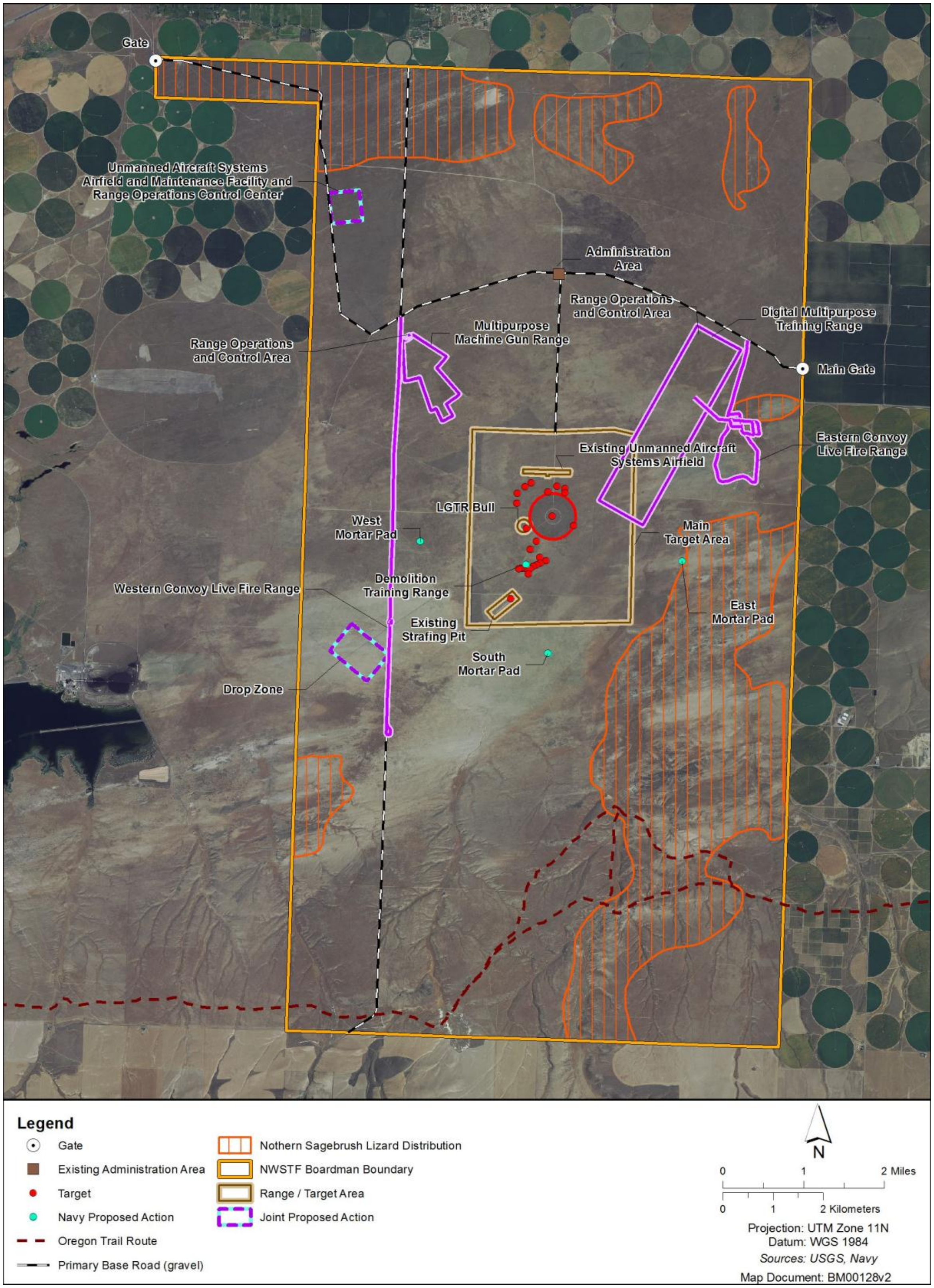

Figure 3.6-5: Northern Sagebrush Lizard Locations at Naval Weapons Systems Training Facility Boardman Based on 1995 Survey Data

3.6.3 Environmental Consequences

3.6.3.1 No Action Alternative

3.6.3.1.1 Noise

Section 3.4 (Noise) describes baseline noise conditions for the Study Area, noise levels associated with training and testing activities, and the potential effects of noise on human receptors. In addition, Section 3.4 (Noise) provides a general introduction to sound and noise, including the various noise descriptors (noise metrics) and methods used to predict noise levels in this EIS. This section analyzes the potential effects of noise on wildlife.

Under the No Action Alternative, wildlife in the NWSTF Boardman Study Area would continue to be exposed to noise associated with the following:

- Fixed-wing aircraft overflights
- Helicopter overflights and takeoffs and landings
- Unmanned Aircraft System (UAS) overflights and takeoffs and landings
- Small arms firing
- Non-explosive practice munitions striking a target or the ground
- Vehicle and equipment operations
- Occasional explosive ordnance disposal

Wildlife Exposure to Fixed-Wing Aircraft Noise

Fixed-wing aircraft overflights take place at various altitudes and airspeeds throughout the SUA (see Figure 1-2) and most occur during the daytime (see Table 2-4). Fixed-wing aircraft do not takeoff or land at NWSTF Boardman and military aircraft do not fly at supersonic speeds in NWSTF Boardman airspace. Only low-altitude flights are a concern from a wildlife exposure perspective because aircraft flying above 3,000 ft. (914.4 m) above ground level are not expected to produce a meaningful response in most wildlife based on wildlife responses described in the literature (e.g., National Park Service 1994, Bowles 1995, Larkin 1996). For discussion purposes here, low-altitude flights generally occur below 3,000 ft. (914.4 m) above ground level and as low as 200 ft. (30.5 m) above ground level for brief periods. These low-altitude flights only take place in Restricted Areas 5701A-E, which consists of 209 square nautical miles (nm^2) of airspace (see Figure 1-3).

The aircraft noise levels that wildlife could be exposed to would vary based on exercise-specific conditions including flight tracks, altitude, air speed, and the type of aircraft. Table 3.4-10 provides A-weighted sound exposure levels (SELs) and maximum unweighted sound levels (L_{max}) for representative aircraft flying at various altitudes. The modeled Lmax contours for 120 and 130 decibels (dB) are plotted in Figure 3.6-6 to show the L_{max} that wildlife could be exposed to under the No Action Alternative during a single event (see Section 7 of the noise study report found in Appendix E, Supporting Noise Studies, for details on noise modeling). The aircraft do not generate 140 dB L_{max} (or greater); therefore, only 120 and 130 dB L_{max} contours are shown in Figure 3.6-6. The 120 and 130 dB L_{max} contours, nearly coincident with only a few hundred feet between, extend approximately 1,000 ft. beyond Restricted Area 5701. Low-Altitude Tactical Training (LATT) with the EA-6B aircraft at 200–500 ft. above ground level is the dominant contributor. The two small lobes to the west that extend approximately 1 mile (mi.) (1.6 kilometers [km]) are caused by the LATT entry path, which was modeled to begin at the edge of Restricted Area 5701. Other areas outside of Restricted Area 5701 are not expected to experience L_{max} of 120 dB or greater based on their higher airspace floors.

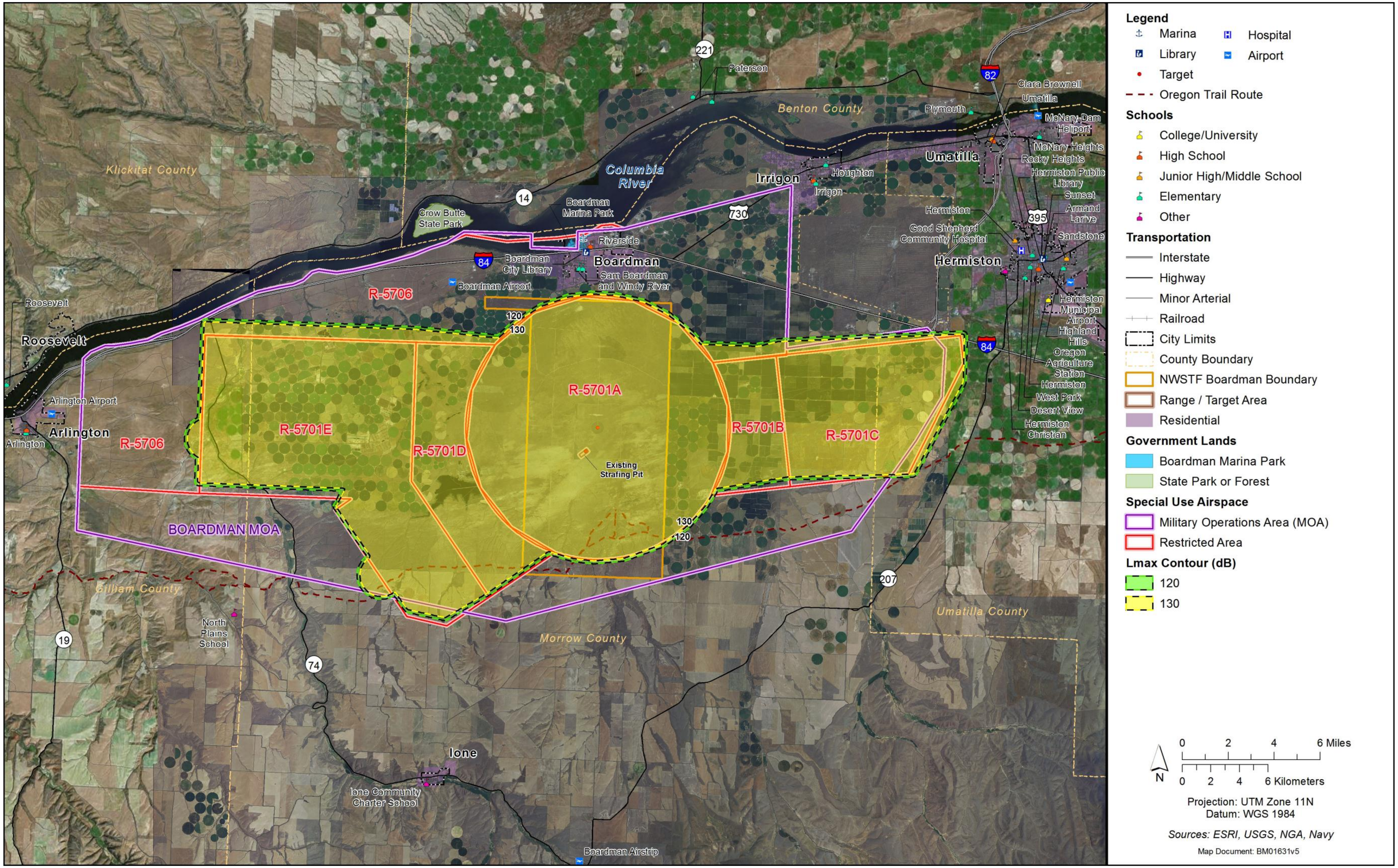

Figure 3.6-6: Single-Event Aircraft Maximum Unweighted Sound Levels (L_{max}) for the No Action Alternative

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In addition to computing the maximum sound levels that wildlife would be exposed to, it is also important to determine the frequency that these events occur. The Number-of-Events At or Above a Selected Noise Threshold (NA) metric, L_{max} 120 dB (NA120) in this case, serves this need. Figure 3.6-7 depicts the daily NA120 for the No Action Alternative. LATT activity along the LATT corridors is the main contributor to daily events above 120 dB L_{max} because of the low altitude and relative frequency of events. The highest concentration of NA120 daily events of 5–10 occurs mostly within the NWSTF Boardman boundary and extends approximately 2 mi. (3.2 km) east of the boundary. The LATT corridors overlap the most in this area. The areas of 3–5 and 2–3 events follow the western and eastern LATT corridors, respectively. As aircraft conducting LATT begin to climb to enter Restricted Area 5706 to the north, the NA120 area ends because the L_{max} decreases to less than 120 dB. The 1–2 event areas are caused by the entry path to the LATT corridors. The remaining areas in Restricted Area 5701 experience less than 1 NA120 per average day.

Wildlife exposure to fixed-wing aircraft noise would be intermittent and brief (seconds) as an aircraft quickly passes overhead. The rate of increase in sound level, which is referred to as the onset rate, is sudden for jet aircraft flying at low altitudes and high airspeeds. The number of times an individual animal could be exposed to aircraft noise during a specific time period (day, month, year, etc.) would be highly variable based on factors such as specific training schedules, flight tracks, altitudes, number of participating aircraft, and biological factors such as local animal movements and seasonal migrations. However, given the size of the airspace (209 nm^2), the number of annual sorties (about 847), the total annual flight time below 3,000 ft. (914.4 m) above ground level (about 820 hours), a typical exercise duration of 1.5 hours, and the modeled NA120 contours shown in Figure 3.6-7, exposure is expected to be infrequent under the No Action Alternative.

Wildlife Exposure to Helicopter Noise

Helicopter overflights take place below 3,000 ft. (914.4 m) above ground level throughout the SUA (see Figure 1-2), but most helicopter activity occurs directly over the NWSTF Boardman land area. About 72 annual helicopter sorties would take place under the No Action Alternative for a total of about 108 flight hours and typical flight duration of 1.5 hours. Approximately 33 percent of the flight hours would occur at night (see Table 2-4). Helicopters land and takeoff at NWSTF Boardman occasionally. Representative helicopter flight altitudes are less than 500 ft. (152 m) above ground level during training exercises. Some exercises might include hovering approximately 20 ft. (6.1 m) off the ground for several minutes.

Wildlife exposure to helicopter noise would be intermittent and infrequent based on the annual number of sorties (72) that would occur under the No Action Alternative. The duration of exposure to noise from a helicopter would be longer than a fixed-wing aircraft overflight because helicopters fly at slower airspeeds. In addition, helicopters hover, land, and takeoff at NWSTF Boardman. Nonetheless, most exposures would still be brief (seconds to minutes). As noted above, most helicopter activity takes place over the NWSTF Boardman land area and is less dispersed compared to fixed-wing aircraft overflights. Therefore, repeated exposure of an individual animal to helicopter noise during a given exercise is more likely than that of a fixed-wing aircraft overflight. The onset rate for helicopter noise is lower than that of a fixed-wing aircraft.

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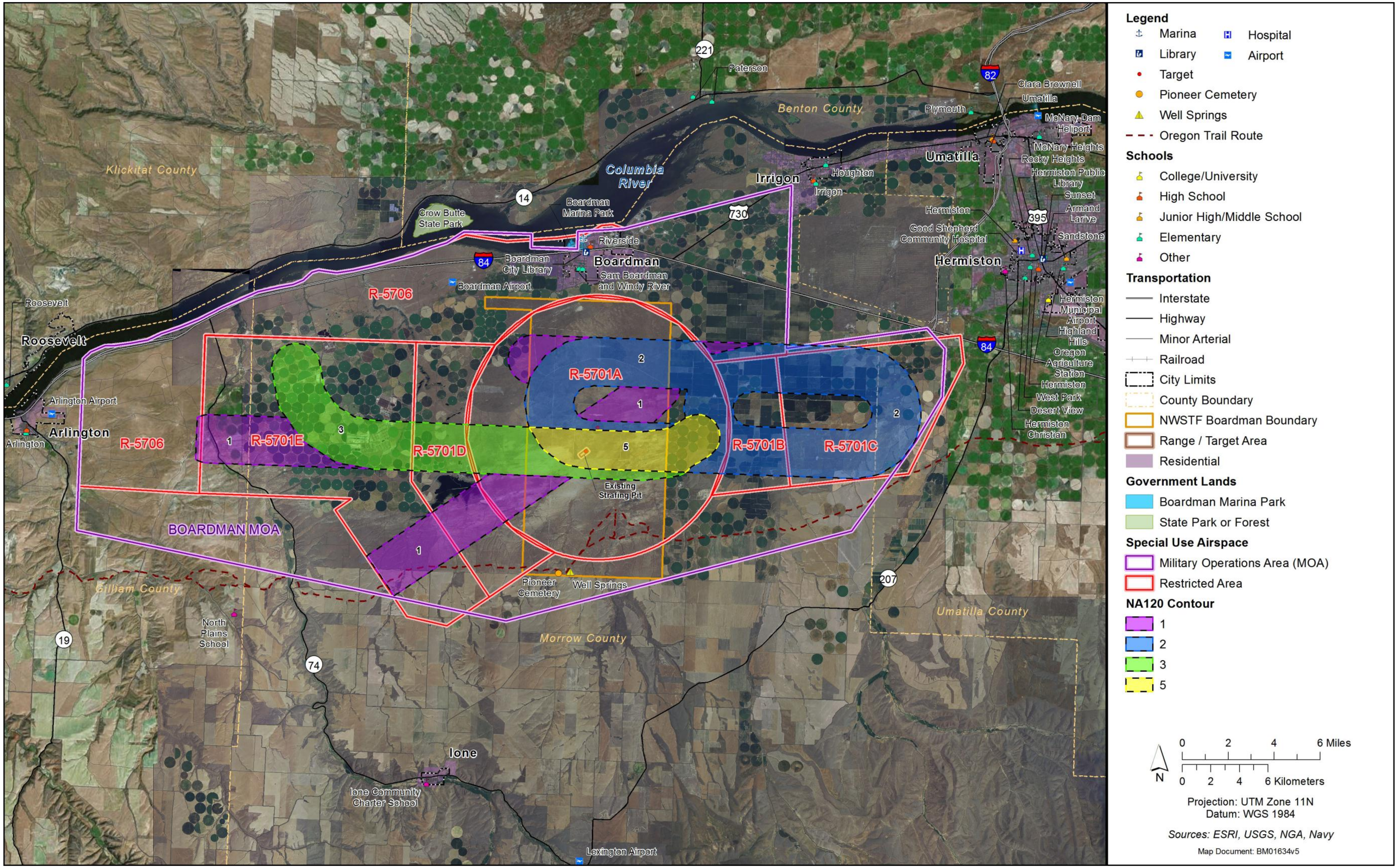

Figure 3.6-7: Aircraft Numbers-of-Events at or above a Maximum Unweighted Sound Level (L_{max}) of 120 Decibels (NA120) for the No Action Alternative

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Wildlife Exposure to Unmanned Aircraft Systems Noise

UAS overflights take place at various altitudes and airspeeds throughout the SUA (see Figure 1-2) and about 85 percent occur during the daytime (see Table 2-4). The RQ-7 Shadow and RQ-11 Raven take off and land at NWSTF Boardman and typically fly below 3,000 ft. (914.4 m) above ground level. The ScanEagle is launched at facilities located outside of NWSTF Boardman and 85 percent of this platform's flight time is above 3,000 ft. (914.4 m) above ground level. Of the 896 annual UAS sorties, 831 are ScanEagle sorties. UASs are estimated to be significantly quieter than the manned fighter jets so, even though the UAS account for more than half of the total existing sorties, their noise contribution to the overall aircraft noise is negligible (see Section 3.4.3.1.2, Training Noise).

Wildlife Exposure to Small- and Medium-Caliber Arms Noise

Most small- and medium-caliber arms firing is currently conducted in the general vicinity of the Main Target area. Therefore, wildlife in the vicinity of the Main Target Area could be exposed to intermittent small- and medium-caliber arms noise. Table 3.4-7 provides SELs for small- and medium-caliber arms. The .50 caliber is the loudest weapon in this category with a SEL of 121.3 A-weighted decibels (dBA) at 50 ft. (15.2 m) from the source. The SELs for all small- and medium-caliber weapons are less than 100 dBA at 800 ft. (243.8 m) from the source.

Wildlife Exposure to Non-Explosive Practice Munitions Noise

Air-to-Ground Bombing Exercises (A-G BOMBEX) at NWSTF Boardman involve dropping various non-explosive practice bombs from fixed-wing aircraft within the Main Target Area (see Table 2-3). A typical exercise might involve dropping two to six non-explosive practice bombs in successive target runs. When a non-explosive practice bomb makes contact with the target, kinetic energy would be transferred and sound would be generated. Sound associated with the impact event is typically of low frequency (less than 250 Hertz) and of a short enough duration (i.e., impulsive sound) that it produces negligible amounts of acoustic energy. This noise would co-occur with aircraft overflight noise. While wildlife near the impact point would likely respond to the overall noise event, it would be difficult to distinguish between responses to the impact noise and the overflight noise, which has a larger footprint. Noise associated with a non-explosive practice bomb impacting the target was not addressed as an independent noise stressor because noise from practice bombs striking the target would co-occur with aircraft noise. Noise associated with non-explosive practice bombs is not addressed in further detail for any of the alternatives.

Wildlife Exposure to Vehicle and Equipment Noise

Currently, vehicles and equipment are negligible sources of noise at NWSTF Boardman (see Section 3.4, Noise). Therefore, these sources are not addressed in detail for wildlife under the No Action Alternative. Noise from vehicles and equipment would have no significant impact on wildlife under the No Action Alternative.

Overview of Wildlife Responses to Noise

General

Numerous studies have documented that wild animals respond to human-made noise (National Park Service 1994, Bowles 1995, Larkin 1996). The manner in which animals respond to noise depends on several factors including life history characteristics of the species, characteristics of the noise source, loudness, onset rate, distance from the noise source, presence/absence of associated visual stimuli, and previous exposure. Noise may cause physiological or behavioral responses that reduce the animals' fitness or ability to grow, survive, and reproduce successfully. The potential effects of noise on wildlife can take many forms, including changing habitat use and activity patterns, increasing stress response, decreasing immune response, reducing reproductive success, increasing predation risk, degrading communication, and damaging hearing if the sound is sufficiently loud (Larkin 1996).

Behavioral responses are the most commonly used endpoints when studying the effects of noise on wildlife. This is largely based on practical considerations and the difficulty in measuring animal fitness or physiological and ecological endpoints. Researchers have documented a range of behavioral responses to noise, ranging from indifference to extreme panic. Common behavioral responses include alert behavior, startle response, flying or running away, and increased vocalizations (National Park Service 1994, Bowles 1995, Larkin 1996). In some instances, behavioral responses could interfere with breeding, raising young, foraging, habitat use, and physiological energy budgets, particularly when an animal continues to respond to repeated exposures.

While difficult to measure in the field, all behavioral responses are accompanied by some form of physiological response such as increased heart rate or a startle response. A startle is a rapid, primitive reflex that is characterized by rapid increase in heart rate, shutdown of nonessential functions, and mobilization of glucose reserves. Animals can learn to control the behavioral reactions associated with a startle response and often become habituated to noise (National Park Service 1994, Bowles 1995, Larkin 1996). Habituation keeps animals from expending energy and attention on harmless stimuli, but the physiological component might not habituate completely (Bowles 1995). Therefore, animal fitness could still be affected when an animal has habituated to noise (Barber et al. 2009). Gill et al. (2001) described theoretical circumstances when habituation to or tolerance of a stressor could be more detrimental to a population than a strong avoidance reaction. Nonetheless, what appears to be habituation has been observed in many studies and is well-demonstrated in studies evaluating bird control devices (e.g., noise cannons, pyrotechnics, and recorded sounds), which are used to scare birds away from airfields and agricultural areas (Larkin 1996). Larkin (1996) describes one example where red-winged blackbirds began resting on the noise cannon that was intended to scare them away. The birds learned to fly a short distance away when they heard the click of the mechanism that released the gas and signaled an impending explosion.

Likewise, a strong and consistent behavioral or physiological response is not necessarily indicative of negative consequences to individuals or to populations (National Park Service 1994, Bowles 1995, Larkin 1996). For example, many of the reported behavioral and physiological responses to noise are within the range of normal adaptive responses to external stimuli, such as predation, that wild animals face on a regular basis. In many cases, individuals would return to homeostasis or a stable equilibrium almost immediately after exposure. The individual's overall metabolism and energy budgets would not be affected assuming it had time to recover before being exposed again. If the individual does not recover before being exposed again, physiological responses could be cumulative and lead to reduced fitness. However, it is also possible that an individual would have an avoidance reaction (i.e., move away from the noise source) to repeated exposure or habituate to the noise when repeatedly exposed.

While the effects of noise on wildlife have been addressed in numerous studies, research is hampered by a preponderance of small, disconnected, anecdotal or correlational studies as opposed to coherent programs of controlled experiments (Larkin 1996). These factors, coupled with differences between species, individuals of the same species, and other factors such as habitat, make it difficult to definitively predict how wildlife populations will respond to noise under a specific exposure scenario. As a result, there are no well-established thresholds or criteria for predicting impacts of noise on terrestrial wildlife.

Hearing Loss

A familiar effect of exposure to high intensity sound is hearing loss, meaning an increase in the hearing threshold. This phenomenon is called a noise-induced threshold shift, or simply a threshold shift (Miller 1974). The distinction between permanent threshold shift and temporary threshold shift is based on whether there is complete recovery of a threshold shift following a sound exposure. If the threshold shift eventually returns to zero (the threshold returns to the pre-exposure value), temporary threshold shift has occurred. The recovery time is related to the exposure duration, SEL, and the magnitude of the threshold shift, with larger threshold shifts and longer exposure durations requiring longer recovery times (Finneran et al. 2005; Mooney et al. 2009). If the threshold shift does not return to zero but leaves some finite amount of threshold shift, then that remaining threshold shift is a permanent threshold shift.

The threshold of physiological hearing damage to the human ear is approximately 140 peak decibels (dBP) (Humes et al. 2005, U.S. Army Public Health Command 2010). Much of the data used to predict human hearing loss from exposure to impulsive sounds is from studies conducted on chinchillas, which are burrowing rodents. Therefore, it is reasonable to use chinchilla hearing threshold shift data to predict hearing threshold shift in Washington ground squirrels. Hamernik et al. (1987) observed varying degrees of temporary and permanent threshold shift in chinchillas exposed to 1, 10, or 100 noise impulses (one every 3 seconds) having peak intensities of 131, 135, 139, or 147 dBP. Damage to the cochlear sensory epithelia was also observed for some exposures. Based on the reported responses of chinchillas, exposure to single event noise levels of 140 dBP or higher is used in this analysis to indicate the potential for hearing threshold shift in Washington ground squirrels. In addition, the number of exposures to a single event noise level above 140 dBP and the time interval between exposures is considered when assessing the potential for threshold shift to occur. In general, a threshold shift is more likely when repeated exposures occur over a short duration.

Long-term effects on wildlife that might experience a threshold shift would depend on whether the shift was temporary or permanent, the severity of the shift, the hearing frequencies affected by the shift, and the time required to recover from a temporary threshold shift. Individual animals with impaired hearing could be more susceptible to predation and would be expected to expend more time and energy trying to detect predators via visual cues rather than auditory cues (e.g., listening for sounds made by an approaching predator or alarm calls of other animals). This could lead to decreased foraging success and decreased fitness. Recovery from a temporary threshold shift can take a few minutes to a few days depending on the severity of the initial shift. Threshold shifts do not necessarily affect all hearing frequencies equally, so some threshold shifts may not interfere with an animal hearing biologically relevant sound. Consequently, a threshold shift would not necessarily result in long-term effects on the individual.

Behavioral Responses, Physiological Stress, and Habituation

Based on information presented above and literature summarized for the other species (National Park Service 1994, Bowles 1995, Larkin 1996), Washington ground squirrels and other wildlife at NWSTF Boardman could exhibit a range of behavioral and physiological responses to noise depending on distance from the noise source. It is also likely that wildlife would habituate to some sound levels. Washington ground squirrels exposed to high sound levels would likely perceive the noise and any associated visual or other cues (e.g., vehicle and equipment movement, other human activity, vibration, or projectile impacting the ground nearby) as a threat and exhibit predator defense behavior including alarm calls and taking cover underground. With repeated exposure over a 2-day training event, such responses have the potential to reduce an animal's fitness by limiting foraging time, increasing energy expenditure, inducing a stress response, and interfering with breeding.

Lost foraging time could make it difficult to obtain enough fat and protein to supply their nutritional needs in hibernation (resulting in high overwinter mortality) or support reproduction (Sherman and Sherman 2011). This would be of particular concern where native perennial food plants favored by Washington ground squirrels have been replaced by exotic perennials and annuals that produce less nutritious seeds or bear seeds too late in the summer for consumption (Sherman and Sherman 2011). In addition, some training would likely coincide with the breeding season (see Table 3.6-3). Washington ground squirrels produce one litter annually. Females are sexually receptive on only one afternoon per season, usually within a few days of emergence from hibernation (U.S. Fish and Wildlife Service 2012). Reproductive success could be diminished if range use coincides with the breeding season.

Various studies have indicated that some animals respond to repeated loud noises by temporarily or permanently abandoning habitat (National Park Service 1994, Bowles 1995, Larkin 1996). While relatively little is known about Washington ground squirrel behavior, this species has several traits that suggest that habitat abandonment might not be a preferred strategy for coping with elevated noise levels. They rely on burrow systems, which they have expended energy to develop, for shelter, protection from predators, and estivation/hibernation. Therefore, abandoning existing habitat would put them at risk. Females are known to form social groups and defend territories (Sherman and Sherman 2011). In addition, home ranges are relatively small and documented dispersal distances of juvenile and adult males are relatively short. Females are not known to disperse and dispersal of juvenile females has not been studied. These factors suggest that habitat abandonment in response to noise is unlikely. If habitat were abandoned, individuals could suffer other consequences such as increased risk of predation. While habitat abandonment seems unlikely, it is possible that animals dispersing from other areas would be deterred from immigrating into areas with high noise levels.

Assuming habitat abandonment does not occur, individuals, particularly those exposed to the highest noise levels, could experience reduced fitness and cumulative stress from noise exposure. It is also possible that individuals would recover during the relatively quiet days (i.e., weekdays between training events). Habituation to some level of noise is also very likely. For example, individuals occupying areas away from the noise source would be most likely to habituate because noise levels would be lower and visual and other cues would be limited. As discussed above, long-term monitoring data indicate that military training at Orchard Training Area in southwestern Idaho, which is similar to the training proposed at NWSTF Boardman, does not appear to affect population dynamics of the Piute ground squirrel.

Disruption of Estivation/Hibernation

A possible concern identified by the USFWS during EIS scoping was that activities could cause Washington ground squirrels to emerge from estivation/hibernation at inappropriate times. If squirrels emerged in response to noise, they would expend energy at a time when they need to minimize energy use. Frequent emergence could result in decreased fat reserves when limited resources are available to replenish those reserves.

Recorded motorcycle noise (95 dBA) caused estivating spadefoot toads to emerge from their burrows in a laboratory experiment (Brattstrom and Bondello 1983). In the wild, auditory cues (e.g., thunder and rain) stimulate spadefoot toads to emerge (Dimmitt and Ruidal 1980). There is no indication that estivating/hibernating Washington ground squirrels or other rodents would be stimulated by auditory cues in the same manner. Bowles (1995) reports that sleeping, estivating, and hibernating mammals are difficult to arouse with noise, particularly meaningless noise (i.e., noise that is not accompanied by an actual threat to the animal). However, Bowles (1995) does not present specific data on noise levels that would or would not arouse sleeping, estivating, and hibernating mammals. Speakman et al. (1991) evaluated energy expenditure in hibernating bats in response to various tactile and non-tactile stimuli, including 5-second bursts of generated sound (greater than 90 dB including background). The susceptibility of bats, as measured by energy expenditure, to all five classes of non-tactile stimulation was low. Only one positive response was measured in 39 applications of sound. The failure of non-tactile stimuli to cause arousals from hibernation may arise because there are selective advantages (i.e., energy conservation) to not arousing to such stimuli in the wild (Speakman et al. 1991). This study suggests that loud impulsive noises (e.g., detonating a large explosive charge), which also produce substantial ground vibration (i.e., tactile stimulation), might be more likely to wake a Washington ground squirrel compared to higher frequency noises that produce less ground vibration (e.g., aircraft overflights).

Washington Ground Squirrel

Washington ground squirrels are known to occur at NWSTF Boardman and on adjacent undeveloped lands to the west. These areas are located under low-altitude flight tracks. Washington ground squirrel populations in these areas have been exposed to noise associated with military aircraft and other military readiness activities for more than 50 years, and would continue to be exposed under the No Action Alternative. Helicopter noise would primarily be limited to NWSTF Boardman. Washington ground squirrels are more likely to respond to fixed-wing aircraft and helicopter noise, rather than UAS noise, based on noise levels generated by these sources. As discussed above, exposure would be intermittent and infrequent, and representative SELs are expected to be less than 120 dBA for fixed-wing aircraft and less than 100 dBA for helicopters. When squirrels are underground, the SEL could decrease by about 3 dB based on data obtained for sound attenuation in burrows of other wildlife species (Bowles et al. 1995). Washington ground squirrels in the vicinity of the Main Target Area would also be exposed to small arms firing noise under the No Action Alternative.

Aircraft overflights are not expected to affect wildlife hearing based on the expected L_{max} values, which are below 140 dB. Small arms firing would be infrequent and intermittent under the No Action Alternative and is not expected to affect wildlife hearing. Masking of biologically meaningful sounds is not expected to be an issue because noise would be intermittent and noise events would be infrequent.

Washington ground squirrel responses to noise have not been studied and no anecdotal accounts of responses to noise have been found in the literature. Washington ground squirrel predator alarm calls have been noted in response to moving vehicles, but it is not known if they were responding to vehicle noise or movement (Northwest Wildlife Consultant 2008). Increased calling by individuals can make them more susceptible to predation (Sherman 1977).

While Washington ground squirrel responses to noise have not been studied, some information exists for other ground squirrels. California ground squirrels (*Otospermophilus beecheyi*), which are in the same family (Sciuridae) as Washington ground squirrels, show higher levels of alertness in the presence of continuous windmill noise (Rabin 2005). Reliance on alert behavior, as opposed to anti-predator calls, is incompatible with other behaviors (e.g., foraging and social behavior) essential in ground squirrel daily activity (Rabin 2005). However, it is unlikely that a pronounced shift from anti-predator call to alert behavior would be observed in an environment where noise was intermittent and infrequent.

Hooper (2011) demonstrated that road noise has the potential to mask the alarm calls of Belding's ground squirrels (*Urocitellus beldingi*), but mainly at peak amplitude levels and only for roadside locations. The effective range of alarm calls produced alongside the road was reduced significantly for all traffic levels. While Hooper (2011) points out that such signal range reductions can have fitness repercussions in the form of increased predation risk, the study did not specifically evaluate predation risk for these apparently stable roadside colonies.

Long-term monitoring data indicate that military training at Orchard Training Area in southwestern Idaho does not affect population dynamics of the Piute ground squirrel (*Urocitellus mollis*, formerly known as the Townsend's ground squirrel [*Spermophilus townsendii mollis*]). Washington ground squirrels and Piute ground squirrels are members of the same genus (*Urocitellus*). The 138,936 ac. (56,227 ha) training area has been used for military training by the Idaho Army National Guard since 1953. Military training activities conducted at Orchard Training Area include small arms, tank gunnery (firing 120 millimeter [mm] gun), artillery training (firing 155 mm howitzer), armored vehicle maneuver training, helicopter training, troop transport, and bivouac. Active Piute ground squirrel burrows have been counted at 79 monitoring plots on Orchard Training Area. Data collected from 1989 through 2001 indicated a significant increasing trend in burrow abundance at approximately 40 percent (32) of the 79 plots (Hlohowskyj et al. 2004). An increasing trend in active burrow abundance was also indicated for 36 (46 percent) other plots, but the trend for these plots was not significant. A negative trend in active burrow abundance was observed at nine (11 percent) monitoring plots, but the trend for these plots was not significant. While no obvious spatial pattern is evident among the plots exhibiting an increasing trend in burrow abundance, 10 of the 32 plots exhibiting a significant increasing trend in the number of active burrow counts were located within the impact area (Hlohowskyj et al. 2004). Both high explosive munitions and non-explosive practice munitions are fired at targets located within the Orchard Training Area impact area. Van Horne and Sharpe (1998) investigated the effects of armored vehicles on Piute ground squirrel on Orchard Training Area. Sagebrush areas and areas dominated by bluegrass have been subjected to low-intensity tracked vehicle operations for 50 years and were compared against similar areas that had no tracked vehicle operations. The study did not detect any effects on ground squirrel population dynamics associated with long-term tracked vehicle operations. While the studies conducted at Orchard Training Area did not specifically evaluate Piute ground squirrel responses to noise, the long-term monitoring data suggest that noise and other potential stressors associated with military training do not appear to be impacting Piute ground squirrel populations at the training area.

Based on responses of other animals (National Park Service 1994, Bowles 1995, Larkin 1996), it is likely that at least some aircraft overflights and small arms firing noise would elicit physiological or behavioral responses in Washington ground squirrels. For example, overflights might cause a startle response, which includes a physiological component (e.g., rapid increase in heart rate, shutdown of nonessential functions, and mobilization of glucose reserves) and a behavioral component (Bowles 1995). The behavioral component could be similar to responses to predators or other natural threats, and might include alert behavior, alarm calls, or retreating underground. Squirrels would be expected to quickly recover from these short-term responses. In addition, it is possible that squirrels have habituated to current levels of aircraft overflights and small arms noise at NWSTF Boardman.

A possible concern identified by the USFWS during EIS scoping was that activities could cause Washington ground squirrels to emerge from estivation/hibernation at inappropriate times. If squirrels emerged in response to noise, they would expend energy at a time when they need to minimize energy use. Frequent emergence could result in decreased fat reserves when limited resources are available to replenish those reserves.

Recorded motorcycle noise (95 dBA) caused estivating spadefoot toads to emerge from their burrows in a laboratory experiment (Brattstrom and Bondello 1983). In the wild, auditory cues (e.g., thunder and rain) stimulate spadefoot toads to emerge (Dimmitt and Ruidal 1980). There is no indication that estivating/hibernating Washington ground squirrels or other rodents would be stimulated by auditory cues in the same manner. Bowles (1995) reports that sleeping, estivating, and hibernating mammals are difficult to arouse with noise, particularly meaningless noise (i.e., noise that is not accompanied by an actual threat to the animal). However, Bowles (1995) does not present specific data on noise levels that would or would not arouse sleeping, estivating, and hibernating mammals. Speakman et al. (1991) evaluated energy expenditure in hibernating bats in response to various tactile and non-tactile stimuli, including 5-second bursts of generated sound (greater than 90 dB including background). The susceptibility of bats, as measured by energy expenditure, to all five classes of non-tactile stimulation was low. Only one positive response was measured in 39 applications of sound. The failure of non-tactile stimuli to cause arousals from hibernation may arise because there are selective advantages (i.e., energy conservation) to not arousing to such stimuli in the wild (Speakman et al. 1991).

A few studies have evaluated the effects of aircraft overflights on rodent populations in the wild. A study at a U.S. Air Force range evaluated three species of hibernating desert rodents exposed to 10 overflights per hour during the day at levels in excess of 80 dB. Treatment areas did not differ significantly in abundance or population density relative to unexposed populations (Bowles et al. 1995). Mouse densities in a field near Memphis International Airport (80–120 dB) were not significantly different than densities in a nearby rural field (80–85 dB) (Chesser et al. 1975). These studies suggest that absolute density of rodent populations does not appear to be affected by aircraft noise at these locations (Bowles et al. 1995). However, Chesser et al. (1975) found that mice collected from the airport field had significantly larger adrenal glands than those collected from the rural field. To determine if noise was the causative factor, mice collected from the rural field were exposed to recorded jet noises at 105 dB for 2 weeks. The experimental group had significantly larger adrenal glands than a control group (Chesser et al. 1975). This appears to be a case where aircraft noise caused a measurable physiological response with no apparent effects on the population. The frequency of overflights in the studies discussed above was substantially higher than those that would occur at NWSTF Boardman under the No Action Alternative.

Washington ground squirrel population dynamics at NWSTF are not fully understood and the effects of aircraft overflights on squirrel populations have never been studied. Nonetheless, available data indicate that squirrel populations at NWSTF Boardman respond to factors such as precipitation and available forage as would be expected. There is no evidence that suggests current levels of aircraft overflights or other noise influence population dynamics at NWSTF Boardman.

In summary, Washington ground squirrels at NWSTF Boardman and adjacent undeveloped lands to the west would be exposed to aircraft overflight noise under the No Action Alternative. Squirrels would also be exposed to small arms firing noise and noise associated with other military readiness activities. Noise may elicit physiological and behavioral responses in Washington ground squirrels. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population level effects would not occur. Noise under the No Action Alternative would have short-term minor effects on Washington ground squirrels. The effects would be widespread throughout NWSTF Boardman and adjacent undeveloped lands to the west. Noise under the No Action Alternative may affect, but is not likely to adversely affect the Washington ground squirrel because the effects would be insignificant.

Special Status Birds

Similar to the Washington ground squirrel, special status birds (see Table 3.6-2) at NWSTF Boardman and adjacent undeveloped lands to the west would continue to be exposed to aircraft noise. Exposure could also occur in other areas of potentially suitable habitat under the SUA, primarily under Restricted Areas 5701A-E where low-altitude flights take place. Exposure would be intermittent and infrequent, and representative SELs are expected to be less than 120 dBA for fixed-wing aircraft and less than 100 dBA for helicopters. When western burrowing owls are underground, the SEL would decrease by 3 dB based on data obtained for sound attenuation in burrows of other wildlife species (Bowles et al. 1995). Birds on NWSTF Boardman and adjacent areas could also be exposed to noise from small arms firing and other military readiness activities.

Aircraft overflights and small arms firing are not expected to affect wildlife hearing based on the expected SELs. Masking is not expected to be an issue because noise would be intermittent and noise events would be infrequent. Based on responses of birds to noise reported in the literature (National Park Service 1994, Bowles 1995, Larkin 1996), it is likely that at least some aircraft overflights and small arms firing noise would elicit physiological and behavioral responses in birds. In addition, it is possible that birds have habituated to aircraft overflights and small arms noise at NWSTF Boardman. There is no evidence that suggests current levels of noise from aircraft overflights or other sources influence bird population dynamics at NWSTF Boardman.

In summary, noise may elicit physiological and behavioral responses in birds under the No Action Alternative. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population level effects would not occur. Noise under the No Action Alternative would have short-term minor effects on special status birds. The effects would be widespread throughout NWSTF Boardman, adjacent undeveloped lands to the west, and other occupied habitat beneath Restricted Areas 5701A-E.

Northern Sagebrush Lizard

Similar to the mammals and birds, northern sagebrush lizard at NWSTF Boardman, adjacent undeveloped lands to the west, and other areas of occupied habitat beneath Restricted Areas 5701A-E would be exposed to aircraft noise. Exposure to small arms noise could also occur if activities are conducted near suitable northern sagebrush lizard habitat (see Figure 3.6-5). Relatively little is known about the responses of reptiles to noise. Sound perception appears to be subordinate in importance to vision or chemoreception in the activities of most reptiles (Manci et al. 1988). Some reptiles have sound-producing mechanisms, but they are absent in the majority of species. Sensitive hearing acuity is essential to the survival of some desert reptiles because critical environmental sounds are often of relatively low intensity movement of insect prey and predators (Manci et al. 1988). Bondello et al. (1979) observed hearing loss in a desert reptile with specialized hearing when exposed to taped dune buggy sounds of 95 dB for 510 seconds in a laboratory.

Noise may elicit physiological and behavioral responses in northern sagebrush lizards. Exposed individuals would be expected to quickly recover from these responses and exposure would be intermittent and infrequent. The short-term behavioral responses are not expected to affect the fitness of individuals. Therefore, population level effects would not occur. Noise under the No Action Alternative would have short-term minor effects on the northern sagebrush lizard. The effects would be widespread throughout NWSTF Boardman, adjacent undeveloped lands to the west, and other areas of occupied habitat beneath Restricted Areas 5701A-E.

3.6.3.1.2 Ground Disturbing Activities and Habitat Alteration

Under the No Action Alternative, the primary causes of ground disturbances would be fire break maintenance, target maintenance, and non-explosive practice munitions impacting the ground surface within the Main Target Area. Ground vehicle traffic would be very limited and would occur on the existing road network.

As discussed in Section 3.5 (Vegetation), fire breaks throughout NWSTF Boardman and areas around targets in the Main Target Area are maintained annually by mechanical disturbance (e.g., plowing or disking) with a tractor. Currently, approximately 462 ac. (187 ha) of fire breaks and 23 ac. (9.3 ha) around targets are maintained for a total area of 485 ac. (196 ha). These maintenance activities alter wildlife habitat by decreasing vegetative cover and disturbing surface soils, which makes the soils unsuitable burrowing habitat for species such as the Washington ground squirrel, badgers, and western burrowing owls. Most non-explosive practice munitions would impact the ground in maintained areas that lack vegetation and would have little additional effect on wildlife habitat. The fire breaks and Main Target Area have been subjected to similar maintenance and disturbance regimes for years. Therefore, ground-disturbing activities under the No Action Alternative would not result in additional loss or alteration of wildlife habitat. Ground disturbing activities under the No Action Alternative would result in long-term, minor, and localized effects on wildlife.

3.6.3.1.3 Physical Strikes

Three categories of physical strike sources that could impact wildlife species under the No Action Alternative include:

- Direct strike by non-explosive practice munitions
- Direct strike by fixed-wing aircraft, helicopters, and UASs
- Direct strike by ground vehicles

If any of these strikes were to occur, the assumed response is mortality.

Non-explosive Practice Munitions Strikes

Various types of non-explosive practice munitions would continue to be fired at or dropped on targets in the Main Target Area (see Tables 2-2 and 2-3) under the No Action Alternative. Most projectiles would make contact within the Main Target Area at or near the designated target, with an occasional round landing within the larger surface or weapons danger zones. Wildlife species could be struck if they were at the point of physical impact at the time of projectile delivery.

Portions of the Main Target Area are highly disturbed from decades of use. Nonetheless, all wildlife groups are expected to use habitats in this area, including species such as the Washington ground squirrel and long-billed curlew. Vegetation around target emplacements, where most projectiles would make contact, is periodically maintained for fire safety. Wildlife species are less likely to use these highly disturbed areas, reducing the likelihood of a strike. Noise is associated with non-explosive practice munitions use and a noise event often occurs prior to weapons firing. For example, pilots fly over the target area to make safety checks before dropping or firing munitions during air-to-ground bombing and gunnery exercises. Some wildlife species might flee the immediate area or take cover underground in response to the fly over, reducing the likelihood of a strike. In addition, small arms training takes place in a deliberate progression, with target placement being followed by a few initial shots, after which feedback is obtained before firing the next series of shots. Again, the likelihood of a strike might be reduced by wildlife responding to the initial stages of an exercise. Also, the likelihood of a relatively small projectile and an animal co-occurring in time and space within the target area is expected to be low. Based on these factors, non-explosive practice munitions are not expected to strike wildlife under the No Action Alternative. Non-explosive practice munitions strikes under the No Action Alternative may affect, but are not likely to adversely affect the Washington ground squirrel. The effects are discountable because a strike is extremely unlikely to occur.

Aircraft Strikes

Wildlife-aircraft strikes are a major concern for the Navy because they can cause harm to aircrews, damage to equipment, and mortality to wildlife. The number of wildlife-aircraft strikes recorded Navywide ranged from 48 to 827 per year (mostly birds) from 1999 through 2009 (Naval Safety Center 2009). Bird strikes may occur during any phase of flight, but are most likely during the take-off, initial climb, approach, and landing phases because of the greater numbers of birds in flight at lower levels. Aircraft strikes with non-avian animals are not expected at NWSTF Boardman and are not analyzed in detail because fixed-wing aircraft do not takeoff or land at NWSTF Boardman, and non-avian animals are expected to avoid encounters with a landing helicopter or UAS. While all bird-aircraft strikes are considered serious and dangerous events, the number of related bird mortalities is small considering Navywide aircraft activities.

Low-altitude, fixed-wing aircraft overflights likely present the greatest risk of bird-aircraft strikes in NWSTF Boardman airspace. High-speed flight in a low-altitude environment places aircraft in airspace that may contain birds in flight. Further, birds may flush in response to approaching aircraft noise. Helicopter training also presents bird-aircraft strike hazards, as all flights occur below 3,000 ft. (914 m) above ground level.

No specific bird-aircraft strike hazard concentrated risk areas have been identified at NWSTF Boardman. A bird-aircraft strike hazard plan is not required because NWSTF Boardman does not have a fixed-wing runway and no natural resources management actions specific to bird-aircraft strike hazard reduction occur or are necessary at this time (U.S. Department of the Navy 2012).

The potential for incidental bird mortality from aircraft strikes exists in the NWSTF Boardman airspace. If they occur, bird-aircraft strikes would be infrequent and a small number of individuals would be affected. No population level effects would be expected based on the small number of individuals potentially affected. Aircraft strikes that might occur under the No Action Alternative would have minor localized effects on birds and are not expected to affect mammals, amphibians, or reptiles. Aircraft strikes under the No Action Alternative would have no effect on the Washington ground squirrel.

Vehicle and Equipment Strikes

Limited ground-based training would continue to take place at NWSTF Boardman under the No Action Alternative. None of this training involves large numbers of vehicles and vehicle use takes place on the road network, which primarily consists of primitive dirt roads. A few gravel roads are periodically maintained. The unimproved nature of most roads limits maximum travel speeds, but provides little impediment to wildlife movement. The potential for wildlife strikes also exists during fire break and target maintenance activities. The potential for incidental wildlife mortality from vehicle strikes exists under the No Action Alternative, but the number of individuals affected would be small based on the limited amount of ground-based training. No population level effects would be expected based on the small number of individuals potentially affected. Vehicle strikes that might occur under the No Action Alternative would have minor localized effects on wildlife. Vehicle strikes may affect, and are likely to adversely affect the Washington ground squirrel under the No Action Alternative.

When considered in combination, strikes from non-explosive practice munitions, aircraft, and ground vehicles would be expected to result in a small number of wildlife mortalities under the No Action Alternative, but the number of individuals would be extremely low relative to local populations. No observable effects on populations are expected. Physical strikes would have minor and localized effects on wildlife under the No Action Alternative. Physical strikes from vehicles and equipment may affect and are likely to adversely affect the Washington ground squirrel.

3.6.3.1.4 Electromagnetic Radiation

Electromagnetic radiation is a form of environmental pollution that may impact wildlife in various ways depending on type of radiation, duration of exposure, and the species of the receiving animal. Effects on birds may include reduced nesting success (Fernie and Reynolds 2005, Balmori 2009) and various behavioral and physiological responses to electromagnetic fields (Fernie et al. 2000, Fernie and Bird 2001), such as disruption of normal sleep-wake cycles through interference with pineal gland and hormonal imbalance. Salford et al. (2003) and Marks et al. (1995) report various effects on mammals from electromagnetic exposure, including changes in alarm and aversion behavior, deterioration of health, reproductive problems, and changes in normal sleep wake patterns. Nishimura et al. (2010) reported response in lizards to low-frequency electromagnetic fields.

Experiments and field observations in these studies were based on continual and long-duration exposure. For instance, Balmori (2009) reports reduced bird activity (breeding and foraging) followed by extirpation within areas saturated with high microwave radiation (greater than 2 Volts/meter [V/m]). The same study reported anomalies in magpies (*Pica pica*), such as plumage deterioration, limps and deformities in limbs, and partial albinism. In another study by Balmori and Halberg (2007), significant declines of house sparrow densities were observed in areas of high electromagnetic field strength. The study predicted that no sparrows would be expected in an electromagnetic field of greater than 4 V/m of long-term constant exposure.

Under the No Action Alternative, wildlife would be exposed to various forms of electromagnetic sources including radar, threat transmitters, communications equipment, and electronic detection equipment, primarily during electronic warfare training events. Under the No Action Alternative, 193 electronic warfare training events would occur in NWSTF Boardman airspace. The effects of this radiation on wildlife cannot be quantified; however, the effects can be expected to be minor for the following reasons: (1) the sources of electromagnetic radiation discussed in this EIS do not expose wildlife species to constant radiation (in other words, no area of NWSTF Boardman is continuously saturated with electromagnetic fields), and (2) beams of electromagnetic radiation (e.g., from radars) may expose birds in flight to increased levels of radiation; however, the birds in flight would be moving through the area and potentially out of the airspace of the main beam.

In summary, under the No Action Alternative, the intensity of electromagnetic effects on wildlife species may be considered minor, where the animal would experience a detectable response to an electromagnetic field, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by electromagnetic fields generated from sources included under the No Action Alternative. Electromagnetic radiation may affect, but is not likely to adversely affect the Washington ground squirrel under the No Action Alternative because any effects would be insignificant.

3.6.3.1.5 Lasers

Military uses of lasers include applications such as target designation and ranging, defensive countermeasures, communications, and directed energy weapons. Targeting and ranging lasers are the only laser applications used during training and testing on the ground at NWSTF Boardman and within the airspace. These platforms and devices are described in Chapter 2 (Description of Proposed Action and Alternatives). Target designation and ranging laser types are relatively low power lasers (compared to directed energy lasers or lasers used for defensive countermeasures). A targeting laser is a low-power laser pointer used to indicate a target for a precision-guided munition, typically launched from an aircraft. The guided munition adjusts its flight-path to home in to the laser light reflected by the target, enabling a great precision in aiming. The beam of the laser target designator is set to a pulse rate that matches that set on the guided munition to ensure munitions strike their designated targets and do not follow other laser beams that may be in use in the area (Northrop-Grumman 2010). The laser designator can be shone onto the target by an aircraft or ground-based personnel. Lasers used for this purpose are usually infrared lasers, so the enemy cannot easily detect the guiding laser light.

Vision damage is the primary concern for wildlife species for the lasers used at NWSTF Boardman. Most studies of the effects of lasers on terrestrial animals involve birds because of the interest in developing deterrents to minimize bird-aircraft strike hazards at airports and wind developments (Baxter 2007, Burton et al. 2011). Fewer studies are available for other species groups, such as terrestrial mammals and reptiles, but the same range of responses (none to avoidance behavior) are expected.

Lustick (1973) conducted an experiment using pulsing light, which indicated that starlings and gulls were able to look directly into the laser beam and not change their behavior. A later study conducted through the National Wildlife Research Center's Mississippi Field Station demonstrated that there was no eye damage to double-crested cormorants (*Phalacrocorax auritus*) that had been exposed to a moderate-power red laser as close as 3 ft. (0.9 m) (Glahn et al. 2000). Furthermore, the bird eye is protected from thermal damage to retinal tissue associated with concentrated laser radiation (U.S. Department of Agriculture 2003).

For several decades, pulsing light has been used on aircraft, aircraft hangers, and high towers as a means of avian management or bird control. In 2001, the U.S. Department of Agriculture's National Wildlife Research Center conducted research on low- to moderate-power, long-wavelength lasers (630–650 nanometers) as an effective, environmentally safe means of dispersing specific bird species under low-light (sunset to dusk) conditions (Blackwell et al. 2002). Results of the U.S. Department of Agriculture research concluded that waterfowl species, wading birds, gulls, vultures, and American crows (*Corvus brachyrhynchos*) have all exhibited avoidance of laser beams during field trials (Blackwell et al. 2002, U.S. Department of Agriculture 2003). However, avoidance reaction times and duration are dependent upon context and species (Blackwell et al. 2002). In general, diurnal birds (active during the day and resting during the night) are not sensitive to extremely intense laser light and elicit a slow avoidance response to lasers. In contrast, nocturnal birds (active during the night and resting during the day) are more sensitive to light and react more quickly to avoid intense light (Blackwell et al. 2002). Blackwell and Bernhardt (2004) found that the avoidance response to pulsed white and wavelength-specific aircraft-mounted light was inconsistent across experiments with cowbirds (*Molothrus* spp.), and there was little or no avoidance behavior in experiments with other species. Also, some studies on the use of lasers for bird control have shown that birds may become habituated to light quickly, and there is a loss of effect as the distance increases from the bird and the laser (U.S. Department of Agriculture 2003).

Under the No Action Alternative, laser guided munitions are used during A-G BOMBEXs within the Main Target Area. There are 133 events of this type per year, but only 20 laser guided bombs are allocated for use (see Tables 2-1 and 2-2). Lasers used at NWSTF Boardman and in the airspace would be similar to the moderate-power lasers from the studies cited above, and therefore no damaging effects on vision would be anticipated. Furthermore, wildlife species may quickly and easily leave an area temporarily or avoid the visual stimulus when operations occur (e.g., when helicopters approach) and return when operations conclude. Further, because laser guided munitions would only be used within the Main Target Area, only wildlife species within this area would be potentially affected.

In summary, under the No Action Alternative, the intensity of effects of lasers on wildlife species may be considered minor, where the animal may experience a detectable response to a laser beam, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by this temporary effect (the duration of the laser beam directly sighted on an animal's eyes) from lasers included under the No Action Alternative. The use of lasers may affect, but is not likely to adversely affect the Washington ground squirrel under the No Action Alternative because any effects would be insignificant.

3.6.3.1.6 Summary and Combined Effects of All Stressors under the No Action Alternative

Activities at NWSTF Boardman would not change from baseline activity levels under the No Action Alternative. Wildlife would continue to be exposed to noise and the primary source would be low-altitude, fixed-wing aircraft overflights. Noise may elicit physiological and behavioral responses in wildlife. Exposed individuals would be expected to recover quickly from these responses and exposure would be intermittent and infrequent. The short-term responses are not expected to affect the fitness of individuals. Therefore, population level effects would not occur.

While invasive plants would continue to degrade habitat at NWSTF Boardman under the No Action Alternative, additional habitat loss or degradation is not expected. Ground disturbing activities would be limited to fire break maintenance, target maintenance, and projectile impacts in previously disturbed areas within the Main Target Area. The potential for aircraft, non-explosive practice munitions, and vehicles to strike wildlife would continue to exist. If strikes were to occur, no population-level effects would occur because only a small number of individuals would be affected. The effects of electromagnetic radiation and lasers on wildlife would be negligible or minor under the No Action Alternative.

The combined effects of all stressors on wildlife are not expected to be appreciably different from the effects of individual stressors. A low probability of mortality exists from physical strikes, but the other stressors are not expected to affect the fitness of individuals. No measurable impacts on local wildlife populations are anticipated under the No Action Alternative. The No Action Alternative would have no significant impacts on wildlife.

3.6.3.2 Alternative 1

3.6.3.2.1 Noise

As discussed in Section 3.4 (Noise), Alternative 1 would result in increased noise within the NWSTF Boardman Study Area compared to baseline noise levels under the No Action Alternative. Noise levels and exposure information for Alternative 1 is provided in Section 3.4 (Noise). Following is a summary of the changes with respect to wildlife exposure:

- Aircraft sorties would increase (see Table 2-4) and SUA would be expanded by establishing the Boardman Low MOA (see Figure 2-5) where fixed-wing aircraft overflights as low as 500 ft. (152.4 m) above ground level would occur.
- A MPMGR, DMPTR, eastern Convoy Live Fire Range (CLFR), and Demolition Training Range (DTR) would be constructed (see Figure 2-4 and Table 2-5) and associated ground-based training would take place (see Table 2-1). This includes increases in small arms firing, firing small arms in new locations (e.g., MPMGR, DMPTR, and eastern CLFR), large arms firing on the DMPTR, and detonation of high explosive charges on the DTR (see Tables 2-2 and 2-3).

Changes in Aircraft Noise

As summarized in Table 2-4, the number of fixed-wing aircraft sorties would increase from 847 to 1,668 per year and helicopter sorties would increase from 72 to 93 per year under Alternative 1. In addition, the fixed-wing aircraft flight tracks for LATT would change to avoid existing airspace obstructions in Restricted Area 5701 (i.e., wind turbines) and use the new Boardman Low MOA (see Figure 3.4-11). Wildlife would be exposed to aircraft noise more frequently based on the number of sorties, and lands beneath the proposed Boardman Low MOA would be exposed to noise from low-altitude overflights.

Maximum aircraft noise levels would decrease under Alternative 1 compared to the No Action Alternative based on retirement of the EA-6B aircraft. As shown in Figure 3.6-8, the 130 dB L_{max} contour would not exist under Alternative 1 because L_{max} of the EA-6B is up to 9 dB greater than its replacement aircraft, the EA-18G. The 120 dB L_{max} contour for Alternative 1 would extend a few hundred feet beyond R-5701 and would be caused by the EA-18G LATT between 200 and 500 ft. above ground level. Although Alternative 1 includes LATT in portions of the proposed Boardman Low MOA, only a small portion along the edge of the proposed Boardman Low MOA is within the NA120 contour of 0–1 daily events (Figure 3.6-9) because of the higher minimum altitude of 500 ft. (152.4 m).

Figure 3.6-9 depicts the daily NA120 for Alternative 1. Many of the areas are the same shape as the No Action Alternative, but now include additional areas for the northeast to southwest LATT corridor area. The numbers of NA120 daily events would increase approximately proportional to the increase in LATT events under Alternative 1. The NA120 contour of 15-20 daily events would occur mostly within the NWSTF Boardman boundary, extending approximately 2 mi. (3.2 km) east of the boundary. The LATT corridors overlap the most in this area. The NA120 contour of 10–15 daily events would extend 5 mi. (8 km) west of the NWSTF Boardman boundary.

Wildlife Exposure to Noise from Training Activities on the New Ranges

Overview

Alternative 1 includes construction and operation of four new training ranges:

- The DMPTR would be used for large arms (up to and including the 120 mm Abrams tank main gun) training

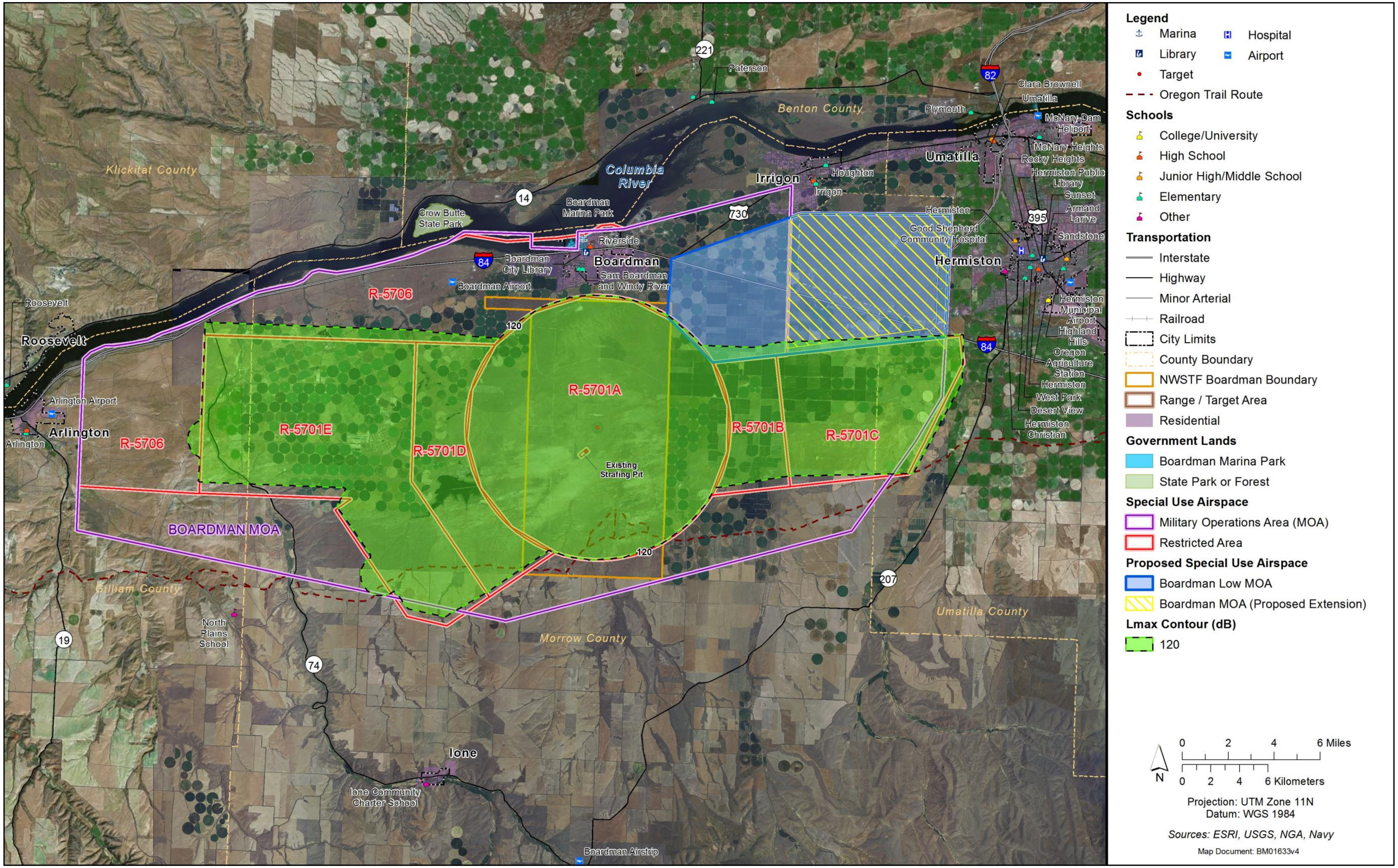

Figure 3.6-8: Single-Event Aircraft Maximum Unweighted Sound Levels (Lmax) for Alternatives 1 and 2

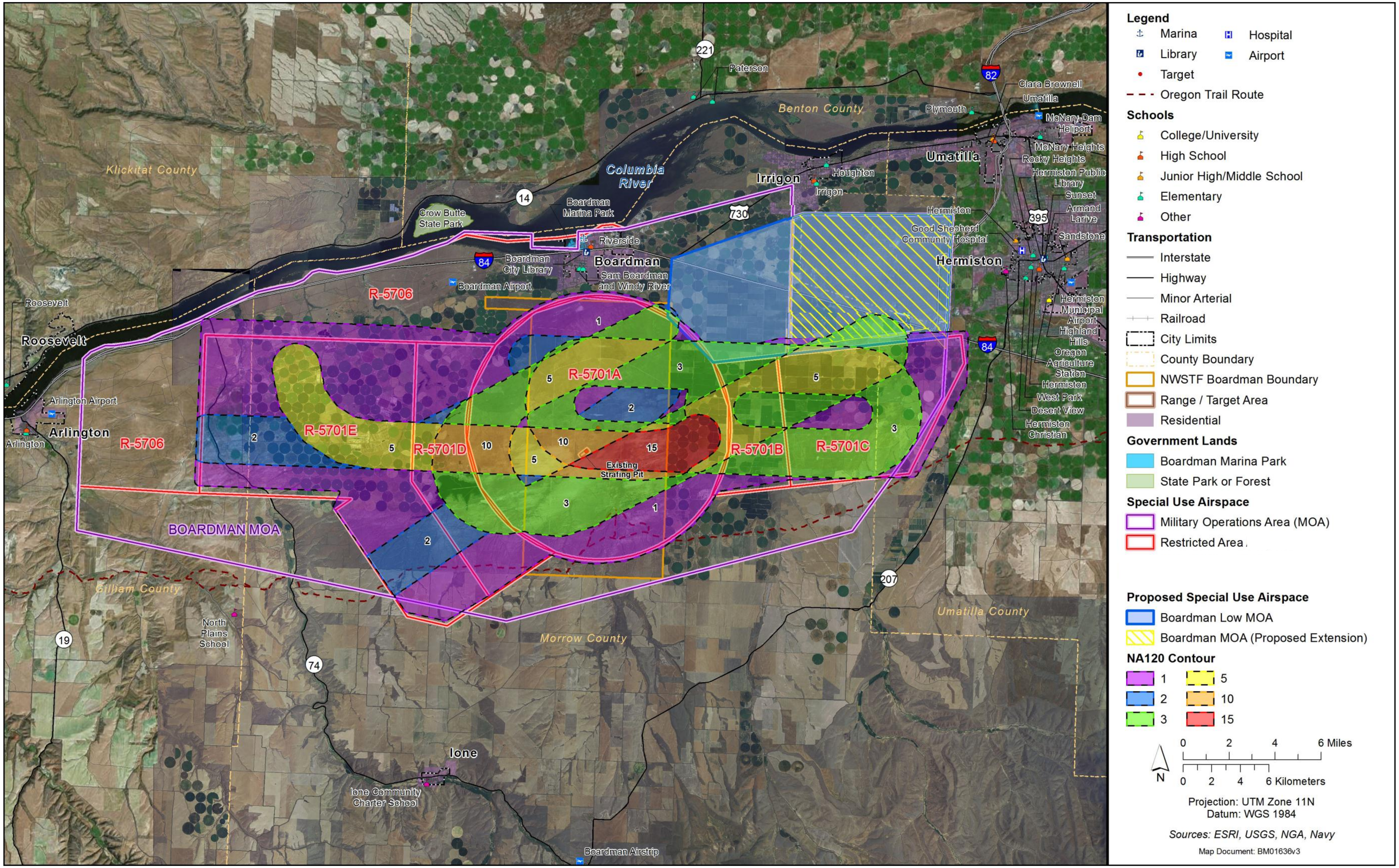

Figure 3.6-9: Aircraft Numbers-of-Events at or above a Maximum Unweighted Sound Level (L_{max}) of 120 Decibels (NA120) for Alternatives 1 and 2

- The MPMGR would be used for small arms (up to and including .50 caliber weapons) training
- The eastern CLFR would be used for small arms (up to and including .50 caliber weapons) training
- The DTR would be used for high explosive charge (up to and including 200 pounds [lb.] [90.7 kilograms {kg}] net explosive weight [NEW] charge) detonation training

Wildlife exposure to noise and potential responses to noise exposure depend on loudness of the weapons or munitions used, the number of days the range is used per year, the time interval between noise events (i.e., frequency of weapons firing during the training), seasonal use of the ranges, and the presence or absence of wildlife in the exposed habitats. Figure 3.6-10 shows the single-event 130 and 140 dBP noise contours for the DMPTR, MPMGR, and eastern CLFR based on the loudest weapon or munitions used on each of these ranges. The noise contours would be smaller when other weapons are fired on these ranges. These single-event noise contours depict the land area that could be exposed to the specified peak sound level and represent a composite of the sound fields surrounding all firing positions on the range. Table 3.6-9 provides a summary of range use for the DMPTR, MPMGR, and eastern CLFR, and the land area within the 140 dBP noise contour.

Digital Multipurpose Training Range

The loudest weapon used on the DMPTR would be the 120 mm Abrams tank main gun. The following representative training scenario was used in the wildlife analysis based on information presented in Tables 2-1, 2-2, and 2-3:

- The 120 mm gun would be fired on the DMPTR during six weekend training events or 12 days per year.
- Firing would take place intermittently at regular intervals. A total of 120 rounds would be expended over a 2-day training event. About two or three rounds would be expended per hour.
- Most or all of the 120 mm firing events would take place between February and May each year based on requirements dictated by the ORNG training cycle.

The 140 dBP noise contour for the DMPTR covers about 995 ac. (403 ha); 580 ac. (235 ha) of which are located within the range footprint (Figure 3.6-10 and Table 3.6-9). The range footprint and most of the area within the 140 dBP contour would also be subjected to other disturbances during training, including general human activity, vehicle operations, target maintenance, projectiles impacting the ground, and small, training-caused wildfires. Some habitat within the 140 dBP contour would also be permanently lost and temporarily disturbed during construction (see Section 3.6.3.2.2, Ground Disturbing Activities and Habitat Alteration) for detailed analysis of ground disturbing activities and habitat alteration). Although it is difficult to predict exactly how the combination of these stressors (including noise) would affect wildlife and their habitat, it is likely that the combined effects would result in long-term habitat degradation and a reduction in wildlife abundance in the affected area.

As noise levels and associated visual cues decrease with increasing distance from the noise source, the potential for adverse effects on wildlife decreases and individuals would be more likely to habituate to noise. Although noise thresholds are not available for wildlife, long-term effects are most likely to occur in areas within the 140 dBP contour.

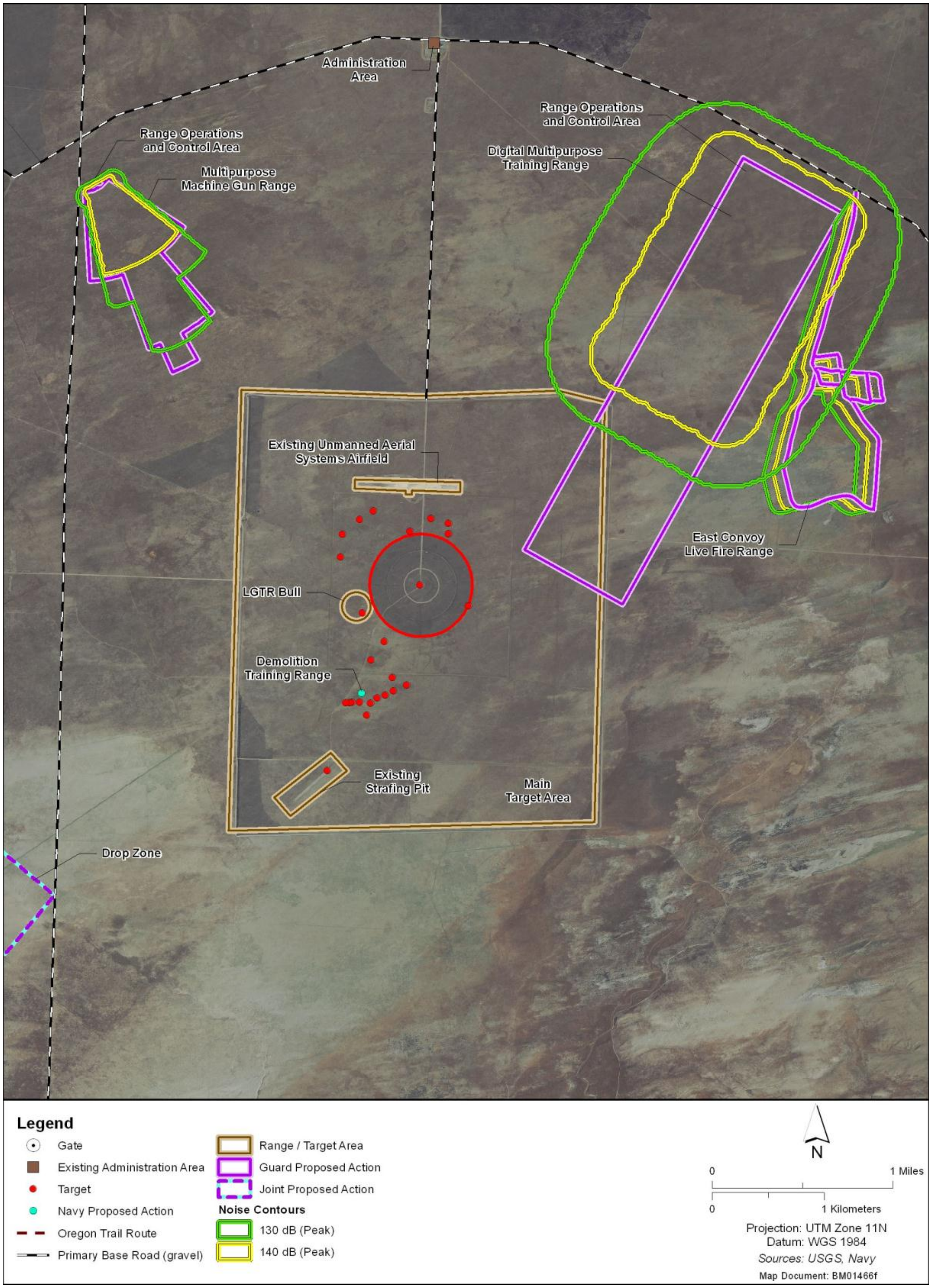

Figure 3.6-10: Single-Event 130 and 140 Decibel Peak Noise Contours (approximate) for the Digital Multipurpose Training Range, Multipurpose Machine Gun Range, and Eastern Convoy Live Fire Range (Alternative 1)

Table 3.6-9: Summary of Range Use and Land Area within the 140 Decibel Peak Noise Contours for the Digital Multipurpose Training Range, Multipurpose Machine Gun Range, and Convoy Live Fire Ranges under Alternatives 1 and 2

Range	Days Used Per Year		Seasonal Use	Loudest Weapon	Land Area (acres) within the 140 Decibel Peak Noise Contours for Loudest Weapon	
	Alternative 1	Alternative 2			Alternative 1	Alternative 2
Digital Multipurpose Training Range	12[1]	0	February–May[1]	120 mm	995	0
Multipurpose Machine Gun Range	117	117	Year Round	.50 caliber	100	100
Eastern Convoy Live Fire Range	45	22.5	Year Round	.50 caliber	113	113
Western Convoy Live Fire Range	0	22.5	Year Round	.50 caliber	0	199
				Totals =	**1,208**	**412**

[1] Days used per year and seasonal use apply to 120 mm gun only. Range would be used up to 21 days per year and other weapons could be fired year round.

Note: mm = millimeters

Multipurpose Machine Gun Range

The MPMGR would be used year round, about 117 days per year, primarily on weekends. The loudest weapon used on this range would be a .50 caliber machine gun or rifle. Training events on the MPMGR would take place in a deliberate progression that involves steps prior to firing weapons. For example, a representative event could include the following:

- Advance crews would arrive to place targets and ensure the range is clear of non-participants.
- Units and equipment would arrive and training plans, safety, and standard operating procedures (SOPs) would be reviewed.
- Weapons would be sighted with a few initial shots, after which feedback is obtained before firing the next series of shots.
- Firing would occur intermittently from about 9:00 a.m. to 6:00 p.m. during 20-minute blocks. Total firing time would be about 2 hours per day. Multiple rounds would be fired from weapons on up to 10 firing lanes during a 20-minute block. Some shots would be fired in rapid succession, but firing would not be continuous during a 20-minute firing block.

The entire MPMGR is historically occupied Washington ground squirrel habitat (see Figure 3.6-2) based on known squirrel detections through 2009 (see Figure 3.6-1). If Washington ground squirrels occupy habitats on or near the MPMGR following construction, individuals would be exposed to weapons firing noise approximately 2 days per week. When the range is active, squirrels would be intermittently exposed to noise about 2 hours per day during six 20-minute blocks of firing time. Based on repeated exposures over a 2-day training period and the information discussed above in the literature review, it is possible that squirrels within the 140 dBP noise contour could experience noise-induced threshold shift and associated negative effects on individual fitness. Behavioral and physiological responses of squirrels to noise within the 140 dBP contour could also result in reduced fitness of individuals.

The 140 dBP noise contour for the MPMGR covers about 100 ac. (40.5 ha), 97 ac. (39.3 ha) of which are located within the range footprint (see Figure 3.6-10 and Table 3.6-9). The range footprint and most of the area within the 140 dBP contour would also be subjected to other disturbances during training, including general human activity, vehicle operations, target maintenance, projectiles impacting the ground, and small, training-caused wildfires. Some habitat within the 140 dBP contour would also be permanently lost and temporarily disturbed during construction. Although it is difficult to predict exactly how each of these stressors would affect wildlife and their habitat, it is likely that the combined effects would result in long-term habitat degradation and a reduction in wildlife abundance in the affected area.

As noise levels and associated visual cues decrease with increasing distance from the noise source, the potential for adverse effects on wildlife decreases, and individuals would be more likely to habituate to noise. Although noise thresholds are not available for wildlife, long-term effects are most likely to occur in areas within the 140 dBP contour.

Eastern Convoy Live Fire Range

Convoy live fire training would be conducted about 45 days per year, primarily on weekends. The loudest weapon used on this range would be a .50 caliber machine gun. Up to platoon-sized (25–50 personnel) convoys would navigate the CLFR within vehicles armed with a machine gun. When units within a vehicle detect an activated target, they would engage the target with bursts of fire (typically seven to nine rounds) from one or more machine guns. Firing on an individual target may occur intermittently for a period of less than a minute. Units would then continue to navigate the CLFR, and detect and engage targets until the training event is concluded. Targets would be within about 328 ft. (100 m) of the CLFR roads and oriented so that firing is directed toward the center of NWSTF Boardman. Specific target locations and the number of targets activated and engaged could vary for each training event to increase training realism. A representative CLFR training event would include multiple scenarios, and multiple runs through the course. Approximately 16 training events could occur per representative 24-hour period. Three to six targets could be engaged per day and total firing time would be approximately 30 minutes within a 24-hour period.

Wildlife would be exposed to weapons firing noise on the eastern CLFR approximately 45 days per year, primarily during 2-day training events. When the range is active, wildlife near active targets would be briefly (up to a few minutes) exposed to weapons firing noise while units engage the target. The potential for wildlife to be repeatedly exposed to weapons firing noise during a training event would depend on specific target placements. For example, if two targets were within approximately 200 ft. (61 m) of each other, their associated 140 dBP contours would overlap. The layout of the eastern CLFR is non-linear; therefore, the potential for the sound fields associated with individual targets could overlap. As discussed above for the MPMGR, it is possible that wildlife within the 140 dBP noise contours of the eastern CLFR could experience noise-induced threshold shift and associated negative effects on individual fitness. Behavioral and physiological responses of wildlife to noise within the 140 dBP contour could also result in reduced fitness of individuals. However, the likelihood that these effects would occur on the eastern CLFR is lower than that of the MPMGR because the CLFRs would be used less frequently and the possibility of repeated exposure is less likely.

The 140 dBP noise contour for the eastern CLFR covers about 113 ac. (45.7 ha), all of which are located within the range footprint (see Figure 3.6-10 and Table 3.6-9).

The eastern CLFR noise contours and the area within the 140 dBP contours assume that targets could be placed along the entire length of the eastern CLFR. Therefore, Figure 3.6-10 depicts continuous noise footprints along the length of the eastern CLFR to provide a worst-case, conservative estimate of the area potentially affected by noise. The actual noise footprint during a training event would not be continuous because discrete target locations would be established.

The range footprint and most of the area within the 140 dBP contours would also be subjected to other disturbances during training, including general human activity, vehicle operations, target maintenance, projectiles impacting the ground, and small, training-caused wildfires. Although it is difficult to predict exactly how each of these stressors would affect wildlife and their habitat, it is likely that the combined effects would result in long-term habitat degradation and a reduction in wildlife abundance in the affected area.

As noise levels and associated visual cues decrease with increasing distance from the noise source, the potential for adverse effects on wildlife decreases and individuals would be more likely to habituate to noise. Although noise thresholds are not available for wildlife, long-term effects are most likely to occur in areas within the 140 dBP contour.

Demolition Training Range

Figure 3.6-11 shows the single-event 130 and 140 dBP noise contours for the DTR based on a 200 lb. (90.7 kg) NEW charge (conservatively modeled as a 220 lb. [99.8 kg] NEW charge). The sound field for charges less than 200 lb. (90.7 kg) NEW would be smaller than the 200 lb. (90.7 kg) NEW sound field. Detonations on the DTR could be conducted any day of the week between the hours of 10:00 a.m. and 4:00 p.m. Charges of 50 lb. (22.7 kg) NEW or less could be detonated year round, but charges of greater than 50–200 lb. (22.7–90.7 kg) NEW would not be detonated from January through August to minimize potential impacts on active Washington ground squirrels and nesting birds, unless necessitated by operational or disposal requirements. A representative annual training scenario for explosive detonation training on the DTR is provided in Table 3.6-10.

Table 3.6-10: Representative Annual Training Scenario for the Proposed Demolition Training Range

Net Explosive Weight	Events Per Year (Days)	Detonations Per Event	Total Detonations Per Year
200 lb.	2	1	2
100 lb.	3	1 or 2	5
50 lb.	3	1–6	10
25 lb.	4	1–6	20
<25 lb.	3	1–6	13
Total =	**15**		**50**

Notes: lb. = pounds, < = less than

While the noise footprint associated with the DTR would be large, this range would be used relatively infrequently. Wildlife within the 140 dBP contours associated with the DTR would be expected to exhibit short-term behavioral and physiological responses to noise, but the time interval between detonations would likely allow for recovery. Seasonal restrictions on the use of charges over 50 lb. (22.7 kg) NEW would also help to minimize negative effects to active Washington ground squirrels and nesting birds. Based on the relatively infrequent use of the DTR and the limited potential for repeated exposure over short periods of time, noise associated with use of the DTR is not expected to result in long-term habitat degradation or a reduction in wildlife abundance in the affected area. The adaptive management and monitoring process described in Section 3.6.3.4.4 (Adaptive Management and Monitoring) would be used to reduce uncertainty associated with potential effects of noise associated with the DTR.

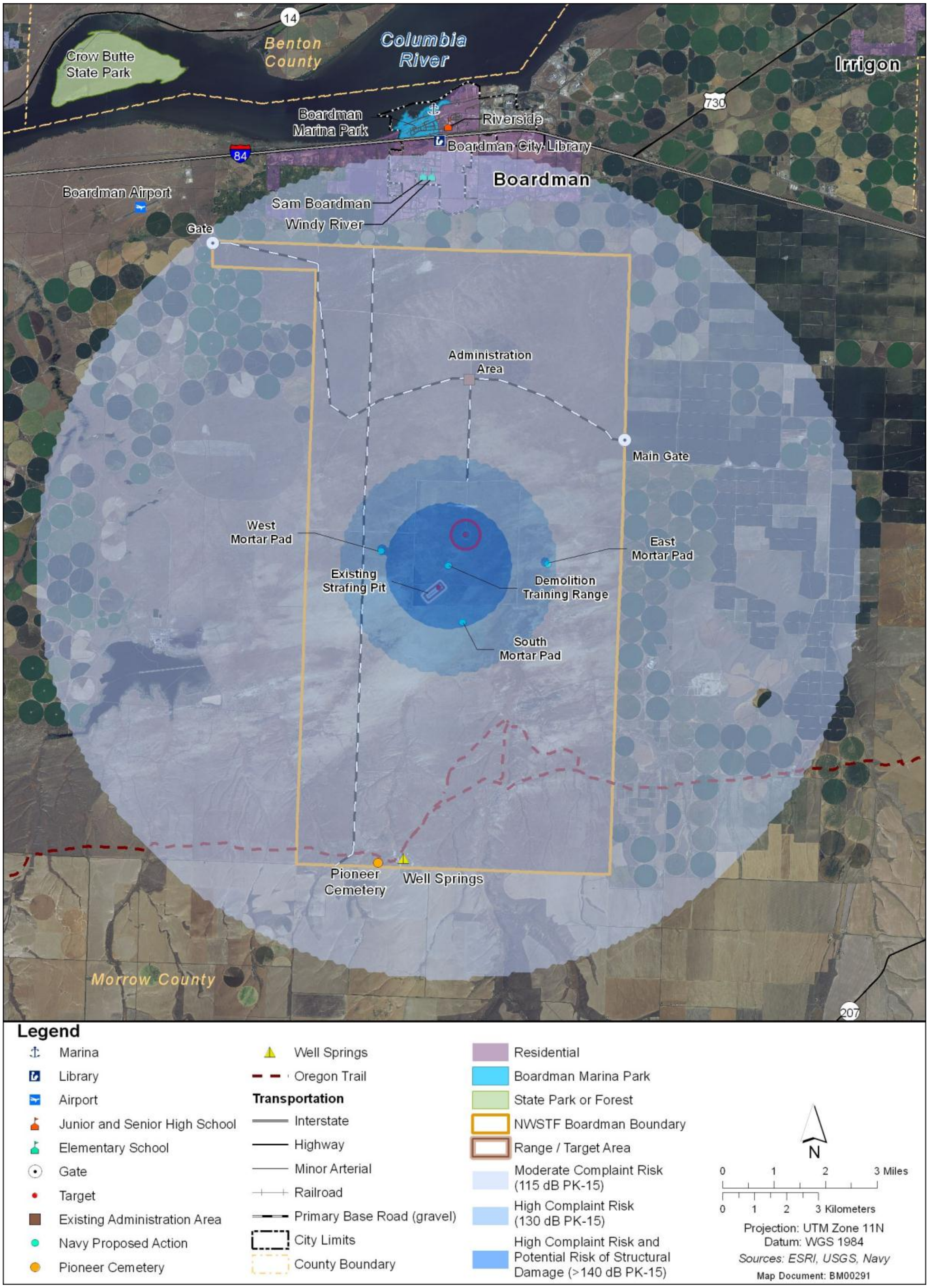

Figure 3.6-11: Projected Single Event Noise Contours for Munitions Activities Associated with the Demolition Training Range under the Proposed Action

Washington Ground Squirrel

Washington ground squirrel responses to aircraft overflights under Alternative 1 would be similar to those described for the No Action Alternative. However, exposure frequency would increase based on the number of sorties. While this increases the likelihood that the fitness of individual squirrels could be affected, it is also likely that individuals would habituate to the more frequent overflights.

Portions of NWSTF Boardman would be exposed to noise levels from weapons firing on the DMPTR, MPMGR, and eastern CLFR that could cause physiological and behavioral responses in Washington ground squirrels. Exposure to range noise would be intermittent, with most range activities occurring only on weekends. Exposure would also vary seasonally. Small arms training would take place year round, 120 mm gunnery training would occur from February through May when squirrels are active, and training on the DTR would be conducted year round with the exception of charges greater than 50–200 lb. (greater than 22.7–90.7 kg) NEW, which would be limited to September through December when squirrels are underground estivating/hibernating, unless necessitated by operational or disposal requirements. During a representative week, squirrels would experience 2 noisy days, followed by 5 days of relative quiet (some aircraft overflight noise). All range training events combined would account for approximately 119 days per year, assuming the MPMGR, DMPTR, or eastern CLFR would be used 2 days each weekend (104 days per year) and the DTR would be used 15 days per year. During a representative year, about 67 percent of the days would be relatively quiet and 33 percent of the days would be noisy.

Individuals within the 140 dBP noise contour for the DMPTR would be repeatedly exposed to loud noise when the range is active (about 12 days for the 120 mm Abrams tank main gun, from February through May), and could experience reduce fitness from hearing threshold shift or behavioral and physiological responses. Individuals within the 140 dBP noise contour for the MPMGR would be repeatedly exposed to loud noise on most weekends, and could experience reduce fitness from hearing threshold shift or behavioral and physiological responses. Squirrels could also be repeatedly exposed in the 140 dBP contour for the eastern CLFR, but the frequency of exposure would be much lower than the MPMGR (up to 45 days per year).

As previously discussed, well-established thresholds or criteria for predicting impacts of noise on terrestrial wildlife do not exist. While a specific noise threshold cannot be defined to predict long-term impacts to Washington ground squirrel fitness based on available data, the Navy and ORNG used 140 dBP to estimate the area where long-term Washington ground squirrel habitat degradation could occur as a result of weapons firing noise on the proposed DMPTR, MPMGR, and eastern CLFR. This value was used because squirrels repeatedly exposed to 140 dBP could experience hearing threshold shifts based on available data for chinchillas and humans (e.g., Hamernik et al. 1987, Humes et al. 2005, U.S. Army Public Health Command 2010). Given the potential for threshold shift, it is also logical to assume that squirrels would exhibit a strong and consistent behavioral and stress response to 140 dBP. It is also likely that squirrels would be exposed to visual and other cues within the 140 dBP contours, making it more likely that squirrels would perceive the loud noise as a threat. When loud noises are perceived as a threat, animals are less likely to habituate to the noise. With repeated exposure to 140 dBP over a 2-day training period, which could occur on the DMPTR, MPMGR, and eastern CLFR under Alternative 1, it appears likely that squirrels could experience reduced fitness, even if threshold shift did not occur.

Washington ground squirrels would also respond to some sound levels below 140 dBP. In addition, it is possible that sound levels below 140 dBP could contribute to long-term habitat degradation when accompanied by visual cues, human activity, ground disturbance, wildfire, or other stressors. As discussed in Section 3.6.3.1.2 (Ground Disturbing Activities and Habitat Alteration), these other stressors would be expected to occur within the range footprints. Therefore, the area within the range footprints, plus the area of the 140 dBP noise contours for the DMPTR, MPMGR, and eastern CLFR outside the range footprints, was defined as the area of long-term habitat degradation for Alternative 1. As depicted in Figure 3.6-10, most of the 140 dBP contours for the DMPTR, MPMGR, and eastern CLFR and a substantial portion of the 130 dBP contour for the DMPTR and MPMGR are within the range footprints. Sound levels below 140 dBP occurring outside the range footprints were not considered as long-term habitat degradation because:

- As noise levels and associated visual cues decrease with increasing distance from the noise source, the potential for adverse effects on Washington ground squirrels decreases and squirrels would be more likely to habituate to noise.
- The DMPTR, MPMGR, and eastern CLFR would primarily be used on weekends, which provides squirrels opportunity to recover from noise exposures.
- Although studies conducted at Orchard Training Area did not specifically evaluate Piute ground squirrel responses to noise, long-term monitoring data suggest that noise and other potential stressors associated with military training do not appear to be impacting Piute ground squirrel populations at the training area.

Proposed compensatory mitigation for unavoidable effects on Washington ground squirrel habitat is discussed in detail in Section 3.6.3.4.3 (Proposed Mitigation Measures). The adaptive management and monitoring process described in Section 3.6.3.4.4 (Adaptive Management and Monitoring) would be used to reduce uncertainty associated with potential effects of noise outside the 140 dBP contours. Noise associated with Alternative 1 may affect, and is likely to adversely affect the Washington ground squirrel.

Special Status Birds

Bird responses to aircraft overflights under Alternative 1 would be similar to those described for the No Action Alternative. However, exposure frequency would increase and the recovery period between exposures would decrease. While this increases the likelihood that the fitness of individual birds could be affected, it is also likely that individuals would habituate to the more frequent overflights.

As discussed above for the Washington ground squirrel, portions of NWSTF Boardman would be exposed to weapons firing noise occurring on the new ranges (Table 3.6-11). Areas that would experience the highest noise levels are in the immediate vicinity of the proposed ranges and primarily consist of annual grass/forb and bunchgrass habitats. Eight species of birds are confirmed breeders in these habitats (see Table 3.6-6), including burrowing owl, grasshopper sparrow, and long-billed curlew (see Figure 3.6-3 and Figure 3.6-4), which are special status species. Other special status species that are expected to commonly forage in these habitats include ferruginous hawk, golden eagle, and Swainson's hawk. As discussed above, most or all of the 120 mm firing events would take place between February and May each year based on requirements dictated by the ORNG training cycle. As shown in Figure 3.6-2, at least portions of the nesting season for the burrowing owl, grasshopper sparrow, and long-billed curlew would coincide with 120 mm gunnery training, small arms training, and some DTR training (detonation of charges 50 lb. [22.7 kg] or less NEW). Charges greater than 50–200 lb. (greater than 22.7–90.7 kg) NEW would not be detonated from January through August to minimize impacts on nesting birds, unless necessitated by operational or disposal requirements.

Short-term behavioral responses of birds to noise during the nesting season have the potential to affect reproductive success. For example, parent birds might temporarily vacate a nest in response to a loud sound, which would increase the susceptibility of eggs or young to heat, cold, and predation or could cause eggs to break (Larkin 1996). The time the parent is away from the nest is an important variable. Awbrey and Bowles (1990) reported that raptors returned to the nest within 10 minutes of flushing in response to aircraft overflights and that multiple exposures spaced 5–10 minutes apart would be required to cause lethal exposure of eggs. Based on the training scenario presented above for 120 mm round firing on the DMPTR, nesting grasshopper sparrows, western burrowing owls, and long-billed curlews in the vicinity of the DMPTR would be exposed to noise two to three times per hour over a 2-day period. This could occur during six training events conducted over a period of 4 months. Nesting grasshopper sparrows, western burrowing owls, and long-billed curlews could also be exposed to small arms noise on the DMPTR, MPMGR, and eastern CLFR and noise from detonation of charges 50 lb. (22.7 kg) NEW or less on the DTR. These species are ground nesters and their eggs and young would be increasingly susceptible to predation if parents repeatedly vacated nests in response to noise. Noise could also disrupt courtship and breeding behavior or result in nest abandonment and failure, ultimately leading to reduced fitness through diminished reproductive success.

Table 3.6-11 provides estimates for the number of grasshopper sparrows, long-billed curlews, and western burrowing owl that could be exposed to peak noise levels greater than or equal 130 dBP during 120 mm gunnery training on the DMPTR.

As discussed previously, bird responses would be related to the distance from the weapons firing noise source or other stimuli (e.g., noise and visual cues associated with tank movement on the range). While it is likely that birds attempting to nest within the 130 or 140 dBP contours would be affected, some studies have demonstrated that nesting birds tolerate noise and that loud impulsive noise does not affect reproductive success.

Table 3.6-11: Number of Grasshopper Sparrows, Long-Billed Curlews, and Western Burrowing Owls Potentially Exposed to Peak Noise Levels Greater than or Equal to 130 Peak Decibels from 120 Millimeter Gunnery Training on the Proposed Digital Multipurpose Training Range

Common Name	Density Estimate (birds per acre)[1]	Birds Potentially Exposed[2]	Percentage of Regional Populations[3] Potentially Exposed		
			BCR 9-OR and WA	BCR 9-OR	Columbia Basin
Grasshopper sparrow	0.11	512	0.34%	5.7%	5.7%
Long-billed curlew	0.036	168	1.06%	2.0%	17.2%
Western burrowing owl	0.009	4	0.04%	0.06%	0.5%

[1] Grasshopper sparrow density estimate is based on the estimated mean abundance of 0.87 (mean number of detections at 100-meter radius point count/survey) reported by Holmes and Miller (2010) for annual grassland habitats at NWSTF Boardman based on 1995–1997 data originally reported by Holmes and Geupel (1998). Long-billed curlew density estimate is from Holmes (2011) based on 2009 survey data collected for the Digital Multi-purpose Training Range. Western burrowing owl density estimate based on distribution of 2009 nesting locations (Robinson 2009).
[2] Birds potentially exposed = density x 4,654 acres (see Table 3.6-9).
[3] Regional population estimates are presented in Table 3.6-7. BCR 9-OR and WA = Portion of Bird Conservation Region 9 located in Oregon and Washington. BCR 9-OR = Portion of Bird Conservation Region 9 located in Oregon. Columbia Basin = Columbia Basin Ecological Province as defined by Anderson et al. (1997).
Note: NWSTF = Naval Weapons Systems Training Facility

Delaney et al. (2002) exposed red-cockaded woodpeckers to .50 caliber blank fire and artillery simulators and found that the measured levels of experimental noise did not affect red-cockaded woodpecker nesting success or productivity. Red-cockaded woodpecker flush response increased as stimulus distance decreased, regardless of stimulus type. Woodpeckers did not flush from nests when artillery simulator blasts were more than 500 ft. (152.4 m) away and SEL noise levels were less than 72 dB unweighted. Only one flush response was documented at a distance of 400 ft. (121.9 m). Woodpeckers returned to their nests on average within 4.4 minutes after being flushed by artillery simulator blasts, while returning no later than 16.2 minutes overall. Woodpeckers did not flush from the nest when .50 caliber blank fire events were more than 500 ft. (152.4 m) away and SEL noise levels were less than 80 dB unweighted. Woodpeckers returned to nests on average within 6.3 minutes after being flushed by .50 caliber blank noise, while returning no later than 26.8 minutes overall (Delaney et al. 2002).

Brown et al. (1999) found that most roosting (72.7 percent) and nesting (92.7 percent) bald eagles showed no activity (i.e., perched motionless) when exposed to weapons-testing noise at Aberdeen Proving Ground in Maryland. Up to several thousand impulsive (less than 1 second) noise events per day may occur at various test ranges across Aberdeen Proving Ground as a result of explosive detonation and small arms, tank, and artillery fire. All nests and roosts were at least 0.3–2.5 mi. (0.5–4 km) from test ranges and no ranges were visible from nests or roosts because of forest cover. Measured noise levels at the nesting and roosting sites ranged from 82 to 126 unweighted dBP, but most noise levels were greater than 100 dBP. No differences in eagle activity were detected when noise levels below 110 dBP were compared to higher noise levels. In addition, nest success and productivity on Aberdeen Proving Ground did not differ from nest success and productivity in adjacent counties of Maryland from 1990 through 1995, suggesting that weapons-testing noise did not influence eagle reproduction (Brown et al. 1999).

Holthuijzen et al. 1990 evaluated the effects of blasting noise on the behavior and productivity of nesting prairie falcons exposed to an average of 90 blasts over an average of 61 days, with peak noise levels averaging 140–145 dB. Behavioral responses (such as changes in the percent of time spent perching, flying, and preening) to the blasting were observed in 54 percent of the blasting events and incubating and brooding adults left their nests approximately 22 percent of the time during blasting. All adults returned to the nests within an average of 3.4 minutes, and birds exhibiting other behavioral responses resumed pre-blast behaviors within about 2.5 minutes. The authors concluded that blasting noise levels up to 140 dB, incurred at a rate no greater than three blasts per day or 90 blasts during the breeding season, do not adversely affect prairie falcon behavior or productivity.

Schueck et al. (2001) evaluated raptor distribution and behavior in relation to military activities at Orchard Training Area. While no significant differences were determined in raptor counts on ranges between training and non-training days, lowest raptor counts were associated with small arms, artillery, and tank training that involved weapons firing. However, noise levels were not measured during the study. Red-tailed hawks, ferruginous hawks, and prairie falcons did not alter their behaviors during firing activities when prey abundance was high, but did do so during periods of low prey abundance. However, northern harriers did not change their behavior relative to training even during low prey years. The authors suggest that differences in nesting locations may help explain why behavioral responses to training by northern harriers differed from other raptors. Northern harriers nested on the ground on and around the training ranges in the Orchard Training Area and may have remained in the area to defend their nests and feed their young, whether or not training occurred. In contrast, most species of hawks and falcons nested on cliffs in the canyon south and west of the training area. They used the training area primarily for foraging and could avoid ranges where training was occurring, with less effect on their nest attendance.

The studies summarized above and numerous other studies summarized in literature reviews (National Park Service 1994, Bowles 1995, Larkin 1996) indicate that responses of birds to noise are influenced by species- and site-specific factors. In general, it would seem that birds nesting on the ground in open grassland habitats at NWSTF Boardman would be more responsive to military training noise than cavity nesters such as the red-cockaded woodpecker or tree nesters such as the bald eagle. For example, cavity nesters will normally retreat into the cavity and only flush when a perceived threat is in the immediate area, while many ground nesters tend to flush with noise and human presence. However, the responses of northern harriers discussed above suggest that species-specific territorial and brooding behavior may influence responses more than nest placement. In addition, long-billed curlews exhibit strong territorial defense behavior and Allen (1980) reports that incubating females usually do not flush when approached by humans unless the intruder comes within about 6.6 ft. (2 m).

In summary, portions of NWSTF Boardman would be exposed to noise levels that could cause physiological and behavioral responses in special status birds. Such responses during the nesting season have the potential to reduce the fitness and reproductive success of individual grasshopper sparrows, western burrowing owls, and long-billed curlews, which are confirmed breeders in the habitat types present in the immediate vicinity of the proposed new ranges. The effects are expected to occur in the vicinity of the new ranges and not extend into the southern portions of NWSTF Boardman or onto the adjacent undeveloped lands. No significant adverse effects on migratory bird populations are expected.

Northern Sagebrush Lizard

Recent wildfires have decreased northern sagebrush lizard habitat at NWSTF Boardman. However, the effects of the fires on northern sagebrush lizard abundance and distribution at NWSTF Boardman are not known. Prior to the wildfires, northern sagebrush lizard habitat (see Figure 3.6-5) was primarily located outside of areas that would be expected to experience the highest noise levels under Alternative 1. Nonetheless, it is possible that some northern sagebrush lizards would be exposed to high noise levels under Alternative 1. While relatively little is known about reptile responses to noise, it is possible that northern sagebrush lizards would exhibit physiological and behavioral responses to noise in the vicinity of the new ranges.

3.6.3.2.2 Ground Disturbing Activities and Habitat Alteration

Introduction

This section analyzes potential effects of ground disturbing activities on wildlife habitat, as well as other stressors that could alter habitat. Proposed activities that would result in ground disturbance include construction, training (non-explosive practice munitions striking the ground and vehicle and equipment operations), and maintenance (fire break and target maintenance). The potential for these activities to directly injure wildlife is addressed separately in Section 3.6.3.2.3 (Physical Strikes), and effects of noise and general disturbance associated with these activities were addressed in Section 3.6.3.2.1 (Noise). Other stressors analyzed in this section that could alter habitat include invasive plants and wildfire.

Construction Activities

Site excavation, grading, and equipment operations during construction of the proposed range enhancements for Alternative 1 would result in temporary disturbances to the ground surface. The area of disturbance for individual construction projects would range from less than 1 to 40 ac. (0.4 to 16 ha). The total area of disturbance would be 92 ac. (37 ha), 13 ac. of which are previously disturbed (see Table 2-5). Approximately 79 ac. (32 ha) of previously undisturbed area would be affected; about 49 ac. (20 ha) would be permanently converted to development, and about 30 ac. (12 ha) would be temporarily disturbed and revegetated in accordance with the post-construction restoration plan

(Appendix F, Additional Biological Information). Construction activities for the range enhancements would be spaced over a period of several years as funding becomes available (see Table 2-6). Therefore, the total area of disturbance at any given time during construction would be much less than 92 ac. (37 ha).

Annual grass/forb, bunchgrass, and open-low shrub communities would be affected based on 1997 mapping data. Ecological condition classifications for the area of disturbance ranged from medium to low based on data collected in 2013. With the exception of the UAS Airfield and Maintenance Facility and the Range Operations Control Center, the area of disturbance is historically occupied Washington ground squirrel habitat (see Figure 3.6-2) based on known detections recorded through 2009 (see Figure 3.6-1). As previously discussed, a systematic Washington ground squirrel survey of the entire NWSTF Boardman property has not been conducted. Therefore, the distributions of squirrel detections and historically occupied habitat presented in the figures are, in part, a reflection of variable survey effort. The area of disturbance for construction activities provides potential foraging habitat for all of the special status birds found at NWSTF Boardman. The area also provides nesting habitat for the grasshopper sparrow, western burrowing owl, and long-billed curlew (see Figure 3.6-3 and Figure 3.6-4). Surveys conducted at NWSTF Boardman (see Figure 3.6-5) indicate that preferred sagebrush lizard habitats do not co-occur with the proposed range enhancement locations.

As discussed in Section 3.6.3.4.4 (Adaptive Management and Monitoring), systematic surveys would be conducted prior to construction to support micrositing decisions. Micrositing would involve looking at proposed construction sites at a “micro” level to identify sensitive features that should be avoided to the extent practicable. Occupied Washington ground squirrel habitat and areas with higher ecological condition classifications (e.g., undisturbed areas with a relatively high percentage of native plant cover) would be avoided in favor of unoccupied habitat with lower ecological condition classifications (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent practicable. Micrositing efforts would primarily be aimed at the UAS Airfield and Maintenance Facility and the Range Operations Control Center. The ability to microsite ranges would be limited based on safety constraints. The survey data would also be used to support post-construction restoration efforts (Appendix F, Additional Biological Information).

As noted above, approximately 49 ac. (20 ha) would be permanently converted to development. Wildlife habitat in these areas would be permanently lost. The area of permanently lost habitat would be small relative to the total land area at NWSTF Boardman (about 0.1 percent). Approximately 30 ac. (12 ha) temporarily disturbed during construction would be revegetated and maintained in accordance with the proposed post-construction restoration plan (Appendix F, Additional Biological Information). After restoration, disturbed areas could provide foraging habitat for Washington ground squirrels and special status birds, as well as nesting habitat. Restoration efforts would include establishment of native plants. Foraging habitat quality could be improved in temporarily disturbed areas that were dominated by invasive plants prior to disturbance, if these areas are not subject to further disturbance during operation of the ranges (see analysis below for training and maintenance activities). The suitability of temporarily disturbed and restored areas for burrowing habitat would depend on the level of disturbance. For example, the natural soil profile would be altered in areas subject to grading or trenching activities. It is unlikely that these areas would be suitable for burrowing for several years following construction. Therefore, a long-term, but not permanent, loss of wildlife habitat would occur in temporarily disturbed and restored areas.

Training Activities

Training activities on the proposed new ranges would result in increased ground disturbance and habitat alteration. Habitat around targets on the new ranges would be disturbed by non-explosive practice munitions striking the ground and during target maintenance. Some of the areas affected would coincide with areas temporarily disturbed during construction, thus hampering restoration efforts. Large caliber weapons firing at the proposed DMPTR would result in ground disturbance and destruction of vegetation. Similar disturbances would occur around target emplacements on the MPMGR and eastern CLFR. Areas disturbed by projectile impacts would likely be colonized by invasive plants, which would further reduce habitat quality. Training activities conducted under Alternative 1 would also increase the risk of wildfire at NWSTF Boardman. Invasive plants and effects of training-caused wildfires are analyzed in more detail below.

Vehicle and equipment use would increase substantially under Alternative 1 during ground-based training events. However, vehicles, including tracked vehicles, would continue to use existing roads or new gravel roads constructed under Alternative 1. No off-road maneuver training is proposed. Vehicle and equipment use during training activities would not result in ground disturbance, but would provide pathways for invasive plant seed dispersal. As discussed in other sections, vehicle strikes, noise, and general disturbance associated with vehicles and equipment used during training could also affect wildlife.

Maintenance Activities

Target and fire break maintenance would result in ground disturbance under the Alternative 1. Maintenance activities around targets in the Main Target Area under Alternative 1 would be the same as those described for the No Action Alternative. Approximately 23 ac. (9.3 ha) would continue to be maintained by mechanical disturbance. Maintenance activities on the DMPTR, MPMGR, and eastern CLFR would include periodic maintenance, repair, and replacement of targets and target support mechanisms. Gravel roads associated with the DMPTR and eastern CLFR would be graded or could include placement of additional gravel. Periodic vegetation control may be required to reduce fire fuel loading or manage exotic vegetation and would be conducted as authorized in approved natural resource and fire management plans. Targets on the eastern CLFR would be relocated periodically to vary the training, and former target locations would be revegetated with native species.

Currently, approximately 462 ac. (187 ha) of fire breaks throughout NWSTF Boardman are maintained annually by mechanical disturbance (e.g., plowing or disking) with a tractor. The *Draft Integrated Wildland Fire Management Plan* (Appendix H) includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and two new fire breaks totaling about 19 ac. (7.7 ha) would be created (Figure 3.13-3). The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha).

Establishment and maintenance of the two new fire breaks would alter 19 ac. (7.7 ha) of potentially suitable Washington ground squirrel habitat. However, areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.

The proposed modifications to the fire break system could result in long-term benefits to vegetation communities at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would also reduce the potential for soil erosion, reduce the likelihood of invasive plant infestations, and improve Washington ground squirrel foraging habitat and bird nesting habitat. Native plants appear important to Washington ground squirrels, with Sandberg bluegrass playing a key role in their diets (Tarifa and Yensen 2004a, b). Restoration efforts would also include use of a roller soil compactor to help stabilize surface soil and speed recovery of burrowing habitat.

Invasive Plants

Vegetation communities and wildlife habitat at NWSTF Boardman would continue to be affected by invasive plants under Alternative 1. Non-native invasive plants, including cheatgrass, threaten Washington ground squirrels by competing with native plants that are important for ground squirrel diets. Exotic annual plant species provide an unstable food resource for ground squirrels because their productivity fluctuates with annual precipitation (Yensen et al. 1992). Washington ground squirrels do eat non-native species, including cheatgrass (Tarifa and Yensen 2004a, Tarifa and Yensen 2004b), but native perennial plant species are more drought-tolerant than annuals. When annual plants dominate the landscape, there is less forage for ground squirrels during drought years and it is available for a shorter period of time (Yensen et al. 1992). Further, plant communities dominated by exotic annuals have lower diversity, reducing dietary choices and probably the ability to avoid toxic secondary compounds (Quade 1994). Exotic-dominated communities are also far more likely to burn than native vegetation (Whisenant 1990).

Ground disturbing activities described above would continue to indirectly affect native plant communities by creating favorable conditions for establishment of invasive plants and providing pathways for seed dispersal. Construction and operation of the proposed new ranges would exacerbate existing invasive plant problems. Construction and military vehicles and equipment coming from offsite would provide a new pathway for introduction of invasive plants and would be a dispersal mechanism for seeds at NWSTF Boardman.

As discussed in Section 3.6.3.4.2 (Proposed Management Practices), several MPs would be implemented to avoid invasive plant infestations, monitor invasive plants, and adaptively manage invasive plants during construction and over the life of the proposed training ranges. In addition to project specific mitigations, NWSTF Boardman-wide invasive plant and noxious weed management actions would be implemented as part of the *NWSTF Boardman INRMP*, with increased efforts to reflect new threats introduced by Alternative 1. The invasive plant and noxious weed management actions, developed in cooperation with USFWS and ODFW, would be reviewed annually and updated as necessary. Key elements of the plan include the following:

- SOPs for preventing and minimizing the introduction and spread of invasive plants
- Updates of the invasive plant inventory and mapping prior to implementing the Proposed Action
- Responsibilities and procedures for integrating efforts of the Navy, ORNG, and The Nature Conservancy
- Criteria for prioritizing management actions
- Short- and long-term monitoring programs
- Annual work plans, including funding requirements and funding sources

Wildfire

Wildfire, in combination with invasive plants, has affected vegetation and Washington ground squirrel habitat at NWSTF Boardman in recent years. Since 1998, wildfires burned more than 85 percent of NWSTF Boardman causing short- and long-term habitat alterations. Large fires swept portions of the installation in 1998 (17,514 ac. [7,088 ha]), 2007 (11,664 ac. [4,720 ha]), 2008 (30,612 ac. [12,388 ha]), and 2015 (approximately 16,000 ac. [6,475 ha]), while smaller areas burned in 2002 (1,639 ac. [663 ha]), 2009 (618 ac. [250 ha]), 2011 (acreage not mapped), and 2013 (1,480 ac [599 ha]) (Figure 3.13-1). The 1998, 2002, 2007, and 2008 fires were started by lightning strikes (U.S. Department of the Navy 2012), the 2011 fire was training related, and the causes of the 2009 and 2013 fires were not confirmed. The 2015 fire was started by spontaneous combustion of a hay stack outside NWSTF Boardman and spread onto the range. Training-related wildfires occur occasionally at NWSTF Boardman. Range safety monitoring by participating military units allows for early detection of training-related fires and rapid response. Therefore, fires that start during training activities are typically contained to relatively small areas compared to lightning-caused fires, which might go undetected for a period of time after ignition.

Historically, the area was comprised of fire-adapted vegetation communities with fire return intervals that likely ranged from about 20–70 years based on information for similar habitats (Leenhouts 1998, Paysen et al. 2000). With the widespread introduction of invasive, non-native annual grasses such as cheatgrass, the amount of fuel for wildfires has increased. Wildfires now tend to be more frequent and more severe (burn hotter), and can be long-term or permanent habitat altering events. Frequent and hot burning fires like those that have occurred at NWSTF Boardman favor a shift from shrublands to grasslands. Humple and Holmes (2001) documented decreases in sagebrush cover and increases in cover of grass, primarily cheatgrass, in study plots following the 1998 fire at NWSTF Boardman.

Increases in training under Alternative 1 would increase the risk of wildfire at NWSTF Boardman. Fires resulting from training activities would be expected to occur on the DMPTR, MPMGR, and eastern CLFR, particularly during dry periods. To address these issues the Navy and ORNG prepared a *Draft Integrated Wildland Fire Management Plan,* which contains a Fire Danger Rating and Wildland Fire Risk Management Matrix (Appendix H). The Plan would be finalized prior to implementing the Proposed Action and includes measures to prevent, monitor, and respond to wildfires. The Navy, ORNG, and other range users would implement the Plan.

While preventive measures are expected to reduce the incidence of training-caused fires, it is possible that one or more fires could occur on the ranges each year. Monitoring conducted during training exercises and onsite firefighting assets would ensure rapid response to training-caused fires, and would help to contain the fires to relatively small areas (e.g., less than 100 ac. [40.5 ha]). While the total area affected by training-caused fires cannot be quantified, long-term adverse effects on vegetation and habitat are likely. A mosaic of recently burned areas, unburned areas, and areas in various stages of recovery would likely develop as the ranges become operational and frequent, small fires occur. Vegetative cover would decrease and bare ground would increase. Conditions would be favorable for establishment and spread of non-native annual grasses such as cheatgrass, although cheatgrass already dominates portions of the proposed ranges. Washington ground squirrels would be more susceptible to predation in areas of bare ground and their available food supply would decrease. Shifts from native grasses to cheatgrass or other invasive plants could also reduce the quality of available forage. For these reasons, training-caused wildfire is expected to have long-term adverse effects on Washington ground squirrel and other wildlife habitat.

Summary and Combined Effects on Wildlife Habitat

This section provides a summary of the analyses presented above and synthesizes this information to consider the overall effects of Alternative 1 on wildlife habitat. Consideration of the combined effects on habitat provides a better understanding of potential population-level effects and helps to define the scope of proposed habitat restoration and enhancement efforts to mitigate adverse effects.

As summarized in Table 3.6-12, Alternative 1 would result in permanent habitat loss and long-term habitat degradation. Permanently lost habitat includes areas that would be converted to structures or facilities such as the UAS airfield, gravel roads, and targets. Complete loss of habitat functions and values would occur in these areas. Long-term habitat degradation, but not complete loss of habitat functions and values, is expected to occur in areas affected by temporary construction disturbance, projectiles striking the ground, training-caused wildfires, invasive plants, weapons firing noise on the DMPTR, MPMGR, and eastern CLFR, and general disturbance caused by increased human activity. The spatial extent of habitat impacts associated with these stressors cannot be fully quantified. However, based on implementation of MPs discussed in Section 3.6.3.4.2 (Proposed Management Practices), the Navy and ORNG expect that long-term habitat degradation would primarily occur within the range enhancement footprints. One exception would be the 140 dBP contours for the DMPTR and MPMGR, 418 ac. (169 ha) of which fall outside the range footprints (see Figure 3.6-10). The 140 dBP contour for the eastern CLFR would be within the range footprint. Therefore, the area of long-term habitat degradation for the DMPTR and MPMGR was calculated as follows: (total range footprint – permanently lost habitat) + area of 140 dBP contour outside the range footprint. Figure 3.6-12 shows the total affected area for the DMPTR, MPMGR, and eastern CLFR. Table 3.6-12 provides a summary of permanent habitat loss and long-term habitat degradation for each range enhancement, broken down by ecological condition class.

The area of permanently lost habitat would be 49 ac. (20 ha) and long-term habitat degradation is expected on 1,713 ac. (693 ha), for a total affected area of 1,763 ac. (714 ha). Most of the affected area is known to be historically occupied by Washington ground squirrels. However, based on the lack of recent, systematic survey data, the entire affected area was assumed to be occupied by Washington ground squirrels for impact assessment and mitigation planning purposes. Assuming that the entire NWSTF Boardman property is suitable Washington ground squirrel habitat, 0.1 percent of the available habitat would be permanently lost and 3.6 percent would be degraded. Quantifying the population-level effects of these habitat impacts is not possible given the current limited knowledge of Washington ground squirrel population dynamics. While squirrel numbers could decline in response to lost and degraded habitat, the area affected would be relatively small compared to the total habitat available at NWSTF Boardman. Therefore, it is unlikely that the viability of the population would be threatened. Large areas of historically occupied habitat would be unaffected by the action. In addition, the proposed habitat mitigation measures discussed in Section 3.6.3.4.3 (Proposed Mitigation Measures) would help to ensure no net loss of habitat quantity or quality and a net benefit to Washington ground squirrel habitat. Proposed activities that would result in habitat loss or degradation under Alternative 1 may affect, and are likely to adversely affect the Washington ground squirrel.

Nesting habitat for grasshopper sparrows, long-billed curlews, and western burrowing owl would also be affected. Given the size of the area of disturbance relative to other available habitats at NWSTF Boardman, impacts on bird habitat under Alternative 1 are not expected to adversely impact bird populations. The effects on northern sagebrush lizard habitat would be negligible under Alternative 1 because sagebrush lizard habitats do not co-occur with the proposed range enhancements.

Table 3.6-12: Summary of Habitat Impacts for Proposed Range Enhancements at Naval Weapons Systems Training Facility Boardman under Alternative 1

Range Enhancement and Ecological Condition Classification of Affected Habitat	Permanent Habitat Loss (acres)	Long-term Habitat Degradation (acres)	Total (acres)
Digital Multipurpose Training Range			
High	0	0	0
Medium-high	1	55	56
Medium	15	723	738
Medium-low	0	8	8
Low	7	485	492
Unclassified	2	107	109
Subtotal =	25	1,378	1,403
Multipurpose Machine Gun Range			
High	0	0	0
Medium-high	0	0	0
Medium	8	193	201
Medium-low	8	6	14
Low	0	0	0
Unclassified	0	20	20
Subtotal =	16	219	235
Eastern Convoy Live Fire Range			
High	0	0	0
Medium-high	0	8	8
Medium	0	97	97
Medium-low	0	6	6
Low	0	2	2
Unclassified	0	2	2
Subtotal =	0	113	113
Demolition Training Range			
High	0	0	0
Medium-high	0	0	0
Medium	1	0	1
Medium-low	0	0	0
Low	0	0	0
Unclassified	0	0	0
Subtotal =	1	0	1
Unmanned Aircraft Systems Airfield and Maintenance Facility and Range Operations and Control Center			
High	0	0	0
Medium-high	0	0	0
Medium	0	0	0
Medium-low	0	0	0
Low	8	1	9
Unclassified	0	0	0
Subtotal =	8	1	9
Total for All Range Enhancements			
High	0	0	0
Medium-high	1	63	64
Medium	24	1,013	1,037
Medium-low	8	20	28
Low	15	488	503
Unclassified	2	129	131
Total =	**50**	**1,713**	**1,763**

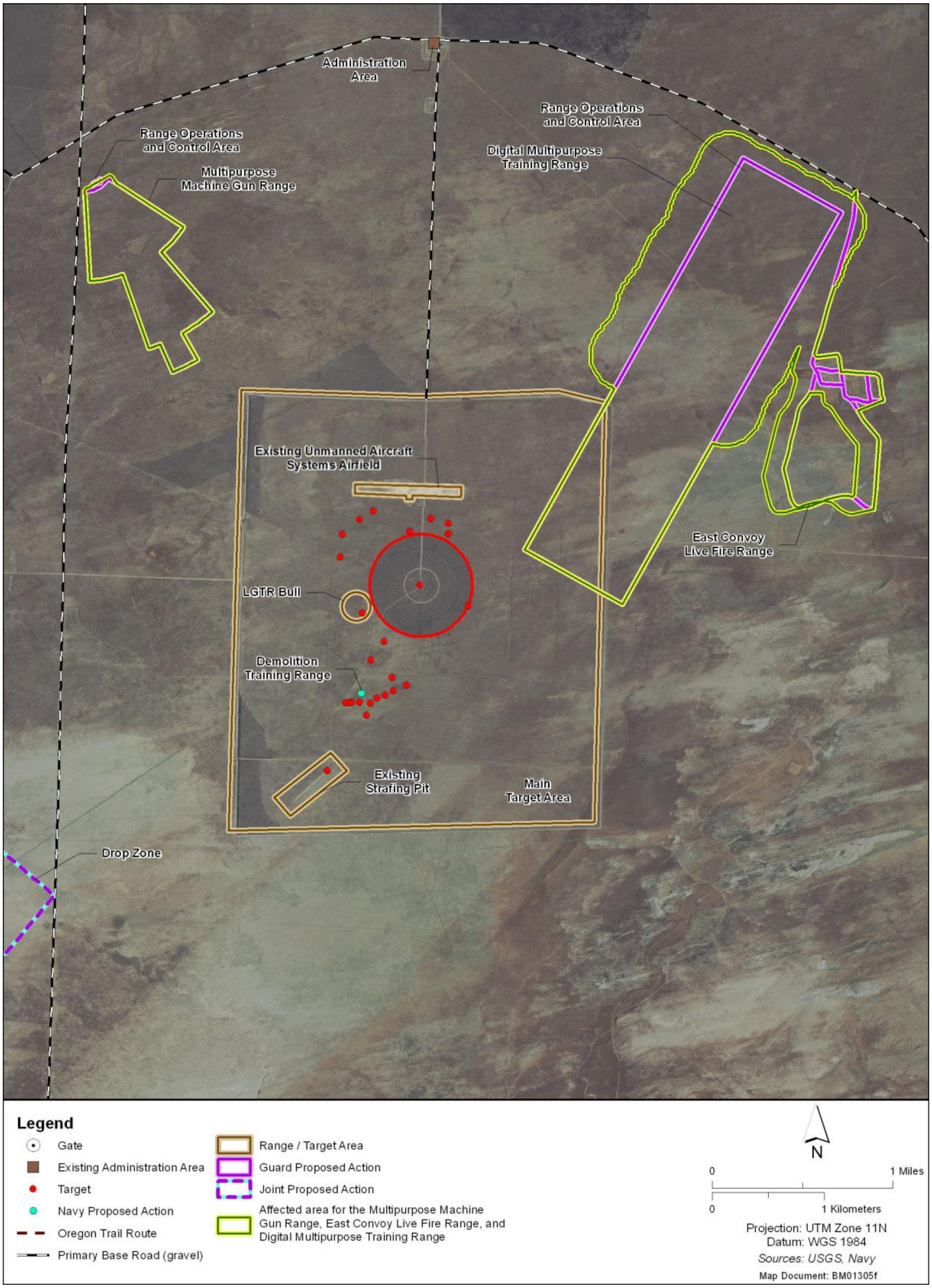

Figure 3.6-12: Area of Habitat Affected by the Digital Multipurpose Training Range, Multipurpose Machine Gun Range, and Eastern Convoy Live Fire Range – Alternative 1

3.6.3.2.3 Physical Strikes

Although the sources of physical strike hazards for wildlife species are the same under Alternative 1 as the No Action Alternative (non-explosive practice munitions, aircraft, and vehicle), Alternative 1 calls for an increase in training activities, new training activities, and range enhancements requiring construction. By increasing use, introducing new activities, and constructing new range capabilities outside of the Main Target Area, wildlife exposure to sources of physical strike increases under Alternative 1.

Non-Explosive Practice Munitions Strikes

The number of non-explosive practice bombs dropped in the Main Target Area under Alternative 1 would be the same as the No Action Alternative, but small- and medium-caliber rounds would increase from about 57,250 to 1,701,800 per year (see Table 2-3). The potential for incidental strikes would increase, but factors discussed for the No Action Alternative, such as animals leaving the immediate area in response to various stimuli, would still reduce the overall chance of a strike and the likelihood of a relatively small projectile and an animal co-occurring in time and space within the target area is expected to be low.

The proposed new ranges would be located in areas that have not been subject to the historical disturbance regimes seen in the Main Target Area and provide quality habitat for a variety of wildlife species. The number of rounds that would be expended on the new ranges is substantially higher than use in the Main Target Area (see Table 2-3). Possible higher wildlife abundance in these areas, coupled with the relatively high number of rounds, increase the chances of a strike occurring. Nonetheless, most rounds would impact the intended target and wildlife will likely learn to avoid areas that present danger to them.

Based on these factors, the risk of non-explosive practice munitions striking wildlife would be low under Alternative 1. If strikes did occur, a limited number of individuals would be affected, and no population-level effects would be expected. For compliance purposes, the Navy and ORNG estimate that up to 12 Washington ground squirrel incidental mortalities could occur per year from a combination of non-explosive practice munitions strikes and vehicle strikes under Alternative 1. As discussed in Section 3.6.3.4.2 (Proposed Management Practices), range control personnel would inspect the target locations at the conclusion of a firing exercise to record and report any mortality. Non-explosive practice munitions strikes would have no significant impacts on wildlife under Alternative 1. Non-explosive practice munitions strikes under Alternative 1 may affect, and are likely to adversely affect the Washington ground squirrel.

Aircraft Strikes

The proposed increases in aircraft and UAS sorties under Alternative 1 increases the chances of bird-aircraft strikes occurring, but the risk level would remain relatively low because NWSTF Boardman does not have a fixed-wing aircraft runway and no specific bird-aircraft strike hazard concentrated risk areas have been identified. The proposed UAS airstrip would be evaluated for bird-aircraft strike risks before it becomes operational and appropriate risk reduction measures would be implemented, if necessary.

The potential for incidental bird mortality from aircraft strikes exists in the NWSTF Boardman airspace. If they occur, bird-aircraft strikes would be infrequent and a small number of individuals would be affected. No population level effects would be expected based on the small number of individuals potentially affected. Aircraft strikes that might occur under Alternative 1 would have minor localized effects on birds and are not expected to affect mammals, amphibians, or reptiles. Aircraft strikes would have no effect on Washington ground squirrels under Alternative 1.

Vehicle and Equipment Strikes

Vehicle and equipment use at NWSTF Boardman would increase substantially under the Alternative 1 during ground-based training events and during construction. During training activities, vehicles and military equipment would be driven on existing roads or new gravel roads constructed under Alternative 1. No off-road maneuver training is proposed. Maximum travel speeds would be limited during training, but the potential exists for Washington ground squirrels to be struck along roads used during training. During construction, vehicle use would be confined to existing roads to the extent possible, but construction equipment would require access to off-road areas to accomplish the work. The potential for wildlife strikes also exists during fire break and target maintenance activities. As discussed in Section 3.6.3.2.2 (Ground Disturbing Activities and Habitat Alteration), fire break maintenance activities would decrease substantially under Alternative 1. The following measures would be implemented to avoid and minimize the risk of strikes:

- Washington ground squirrel locations would be identified during pre-construction surveys and monitoring would be conducted during construction to avoid strikes by construction equipment.
- Data from long-term Washington ground squirrel monitoring would be used, in part, to identify areas along heavily traveled roads and maintained fire breaks where squirrel encounters would be most likely. This information would be used to increase awareness and vigilance of range users and equipment operators.
- On NWSTF Boardman, to improve vehicle operation safety, be protective of wildlife, and reduce dust emissions, the vehicle speed limit for the range is 25 mi. per hour (mph) (40 kilometers per hour [kph]) unless otherwise posted; however, emergency situations, operational necessities, and certain training events may require vehicle speeds to exceed this standard speed limit. At all times on the range, vehicle operators shall use extreme caution and operate at a slow, safe speed consistent with the mission, safety, and current road and environmental conditions. Vehicle operators shall be cognizant and protective of pedestrians and wildlife while conducting all range activities.
    - The only road posted above 25 mph (40 kph) is the Admin Main road from the main gate access to the range from Bombing Range Road to the on-range road known as "The Interstate." Speed limit on the Admin Main Road is 30 mph (48 kph).
    - It is not expected that training requirements will require speeds in excess of 25 mph (40 kph) on a routine basis; however, in some training events, vehicles need to be able to react to changing tactical situations in training as they would in actual combat. Training differently than that which would be needed in an actual combat scenario would decrease training effectiveness and reduce the crew's abilities. During these activities, the 25-mph (40 kph) speed limit may need to be exceeded for brief periods.

Although the risk of vehicles or equipment striking a Washington ground squirrel and other wildlife cannot be eliminated, the measures listed above would minimize risk. If strikes did occur, a limited number of individuals would be affected, and no population level effects would be expected. For compliance purposes, the Navy and ORNG estimate that up to 12 Washington ground squirrel incidental mortalities could occur per year from a combination of non-explosive practice munitions strikes and vehicle strikes under Alternative 1. As discussed in Section 3.6.3.4.2 (Proposed Management Practices), range control personnel would inspect the training area, including target areas and heavily travelled roads, at the conclusion of a ground-based training exercise to record and report any mortality. Vehicle and equipment strikes under Alternative 1 would have minor localized effects on wildlife. Vehicle and equipment strikes may affect, and are likely to adversely affect the Washington ground squirrel under Alternative 1.

3.6.3.2.4 Electromagnetic Radiation

Alternative 1 calls for the increase in electronic warfare training events from 193 to 500 events per year (see Table 2-1). Wildlife would be exposed to various forms of electromagnetic sources including radar, threat transmitters, communications equipment, and electronic detection equipment, primarily during electronic warfare training events. The increase in electronic warfare training, relative to the No Action Alternative, may increase exposures to individual animals. The effects of this radiation on wildlife cannot be quantified; however, the effects can be expected to be minor for the following reasons: (1) the sources of electromagnetic radiation included in Alternative 1 do not expose wildlife species to constant radiation (in other words, no area of NWSTF Boardman is continuously saturated with electromagnetic fields), and (2) beams of electromagnetic radiation (e.g., from radars) may expose birds in flight to increased levels of radiation; however, the birds in flight would be moving through an area and potentially out of airspace of the main beam.

In summary, under Alternative 1, the intensity of electromagnetic effects on wildlife species may be considered minor, where the animal would experience a detectable response to an electromagnetic field, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by electromagnetic fields generated from sources included under Alternative 1. Electromagnetic fields may affect, but are not likely to adversely affect the Washington ground squirrel under Alternative 1 because the effects would be insignificant.

3.6.3.2.5 Lasers

Under Alternative 1, laser guided munitions would be used during A-G BOMBEXs within the Main Target Area. The use of laser guided munitions under Alternative 1 would be the same as under the No Action Alternative (20 laser guided munitions within the Main Target Area). Abrams tanks and Bradley fighting vehicles would also use laser optics and designators under Alternative 1. However, the anticipated effects of laser use under Alternative 1 would be the same as under the No Action Alternative.

Under Alternative 1, the intensity of effects of lasers on wildlife species may be considered minor, where the animal may experience a detectable response to a laser beam, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected under Alternative 1. The use of lasers may affect, but is not likely to adversely affect the Washington ground squirrel under Alternative 1 because the effects would be insignificant.

3.6.3.2.6 Summary and Combined Effects of All Stressors under Alternative 1

Potential impacts on wildlife would increase under Alternative 1 compared to the No Action Alternative. Potential impacts would primarily be associated with construction of the proposed range enhancements and use of the new ranges. Wildlife would be temporarily displaced during construction and some individuals could be injured or killed during construction. If construction activities commenced during the breeding season, a primary concern would be displacement of birds and diminished reproductive success of grasshopper sparrows, western burrowing owls, and long-billed curlews. Therefore, MPs include starting construction activities outside of the breeding season. Construction would result in permanent loss of approximately 49 ac. (20 ha) of wildlife habitat to development, temporary disturbance to approximately 30 ac. (12 ha) of wildlife habitat, and fragmentation of wildlife habitat. The area of permanently lost habitat would be small relative to the total land area at NWSTF Boardman (about 0.1 percent). Temporarily disturbed areas would be susceptible to invasive plant infestations, but these impacts would be addressed through post-construction restoration efforts (Appendix F, Additional Biological Information). Displaced wildlife would likely repopulate the immediate area following construction.

Following construction and restoration, wildlife using habitats on and in the vicinity of the new ranges would be exposed to stressors associated with new training activities, including noise associated with weapons firing on the DMPTR, MPMGR, and eastern CLFR, and detonation of high-explosive charges on the DTR. Substantial increases in vehicle use and general disturbance associated with human activities would also occur. Required target maintenance and projectiles impacting target emplacements would result in ground disturbance, which could result in long-term localized impacts on wildlife habitat.

As discussed in the noise analysis presented above for Alternative 1 (see Section 3.6.3.2.1, Noise), portions of NWSTF Boardman would be exposed to weapons firing and explosive detonation noise occurring on the new ranges. Noise exposure would be intermittent because the DMPTR, MPMGR, and eastern CLFR would primarily be used on weekends and the DTR would be used about 15 times per year. Some wildlife species may avoid or minimize noise exposure by leaving or avoiding the immediate area in response to activities that take place prior to weapons firing or detonation.

Nonetheless, wildlife could potentially be exposed to loud noise that could affect hearing and elicit physiological and behavioral responses in individuals. Such responses could reduce the fitness and reproductive success of individuals that use habitats in the vicinity of the loudest and most frequent noise sources (weapons firing on the DMPTR, MPMGR, and eastern CLFR). Special status species most likely to be affected include the Washington ground squirrel, grasshopper sparrow, western burrowing owl, and long-billed curlew. The effects are expected to occur in the vicinity of the new ranges and not extend into the southern portions of NWSTF Boardman or onto adjacent undeveloped lands.

While scientific limitations preclude quantification of population-level effects, it is possible that the Washington ground squirrel population at NWSTF Boardman could decline in response to the combined effects of construction activities and noise under Alternative 1. Population declines could result from reduced fitness of individuals and diminished reproductive success, as well as lost or diminished habitat quality. These impacts are not expected to occur in the southern portion of NWSTF Boardman or on the adjacent undeveloped lands.

Alternative 1 may have significant impacts on wildlife, because local declines in Washington ground squirrel population could occur. Although not required by ESA, the Navy and ORNG (acting as the National Guard Bureau's [NGB's] agent) engaged in early conferencing with the USFWS to address impacts on the Washington ground squirrel and develop conservation measures to avoid, minimize, and mitigate impacts on this candidate species. The USFWS issued a Conference Opinion for the Preferred Alternative (Alternative 2) on December 2, 2013 (Appendix B, Regulatory Correspondence). The MPs, mitigation measures, monitoring, and adaptive management process outlined in Section 3.6.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures) reflect conservation measures contained in the Conference Opinion. No population level effects or significant impacts are expected for other mammals, birds, or reptiles.

3.6.3.3 Alternative 2

3.6.3.3.1 Noise

As discussed in Section 3.4 (Noise), Alternative 2 would result in increased noise within the NWSTF Boardman Study Area compared to the No Action Alternative. Aircraft noise under Alternative 2 would be the same as Alternative 1, but the following changes to the proposed new ranges would occur under Alternative 2:

- The DMPTR would not be constructed and operated.
- Three mortar firing points would be established at locations shown in Figure 2-3 and up to 480 non-explosive practice mortar rounds would be fired from each point per year (1,440 total; see Table 2-2). SELs are presented in Table 3.4-9.
- A second CLFR (western CLFR) would be established at the location shown in Figure 2-3. Approximately 50 percent of the training that would be conducted on the eastern CLFR under Alternative 1 would be conducted on the western CLFR under Alternative 2. The total amount of CLFR training and rounds expended on the CLFRs would not change.

Figure 3.6-13 shows the single-event 130 and 140 dBP noise contours for the MPMGR, eastern CLFR, and western CLFR based on the loudest weapon or munitions used on each of these ranges. The noise contours would be smaller when other weapons are fired on these ranges. These single-event noise contours depict the land area that could be exposed to the specified peak sound level and represent a composite of the sound fields surrounding all firing positions on the range. Table 3.6-9 provides a summary of range use for the MPMGR and CLFRs, and the land area within the 140 dBP noise contour.

Under Alternative 2, the 140 dBP noise contours for the MPMGR and eastern CLFR would be the same as Alternative 1, and would cover about 100 ac. (40.5 ha) and 113 ac. (45.7 ha), respectively. The 140 dBP noise contour for the western CLFR would cover about 199 ac. (80.5 ha), 176 ac. (71.2 ha) of which are located within the range footprint. The total area within the 140 dBP contours for these ranges would be 412 ac. (168 ha). The area within the 140 dBP contours for Alternative 2 would be 796 ac. (322 ha) less than Alternative 1 because the DMPTR would not be constructed and operated (see Table 3.6-9). Noise contours for the DTR under Alternative 2 would be the same as Alternative 1.

As discussed for Alternative 1, Washington ground squirrels and other wildlife within the 140 dBP noise contours for the MPMGR and CLFRs could be repeatedly exposed to loud noise, and could experience reduced fitness from hearing threshold shift or behavioral and physiological responses. The range footprint and most of the area within the 140 dBP contours would also be subjected to other disturbances during training, including general human activity, vehicle operations, target maintenance, projectiles impacting the ground, and small, training-caused wildfires. Although it is difficult to predict exactly how each of these stressors would affect wildlife and their habitat, it is likely that the combined effects would result in long-term habitat degradation and a reduction in wildlife abundance in the affected area. Based on the rationale presented for Alternative 1, the area within the range footprints, plus the area of the 140 dBP noise contours for the MPMGR and CLFRs outside the range footprints, was defined as the area of long-term habitat degradation for Alternative 2.

Special status birds most likely to be affected include the grasshopper sparrow, western burrowing owl, and long-billed curlew, which are confirmed breeders in the habitat types present in the immediate vicinity of the proposed new ranges. Exposure during the nesting season has the potential to reduce the fitness and reproductive success of individual grasshopper sparrows, western burrowing owls, and long-billed curlews, but no significant adverse effects on migratory bird populations are expected.

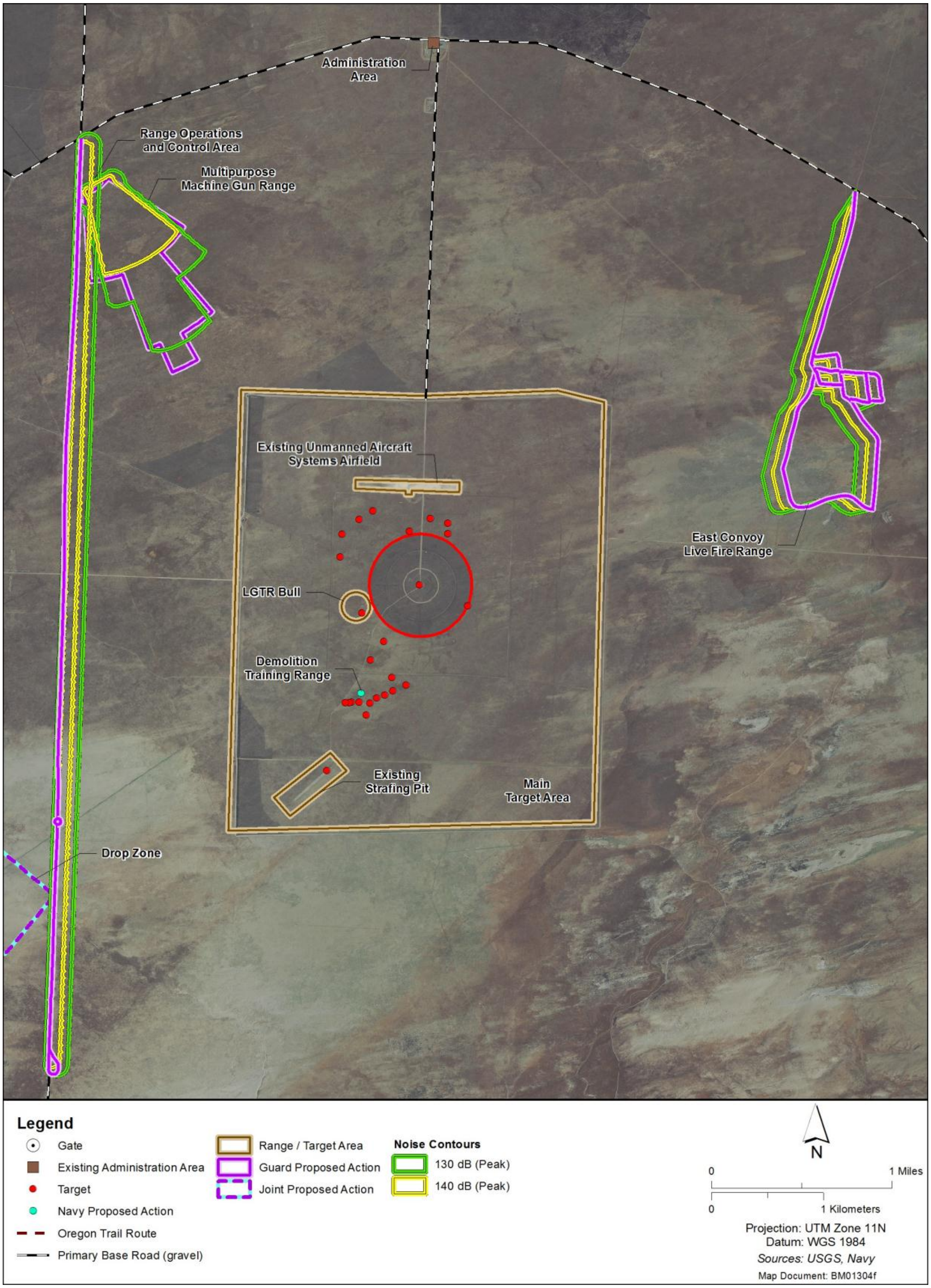

Figure 3.6-13: Single-Event 130 and 140 Decibel Peak Noise Contours (approximate) for the Multipurpose Machine Gun Range and Convoy Live Fire Ranges

Similar to Alternative 1, northern sagebrush lizard habitat is primarily located outside of areas that would be expected to experience the highest noise levels under Alternative 2. Nonetheless, it is possible that some northern sagebrush lizards would be exposed to high noise levels under Alternative 2. While relatively little is known about reptile responses to noise, it is possible that northern sagebrush lizards would exhibit physiological and behavioral responses to noise in the vicinity of the new ranges.

While scientific limitations preclude quantification of population-level effects, it is possible that the Washington ground squirrel population at NWSTF Boardman could decline in response to the combined effects of noise under Alternative 2. Population declines could result from reduced fitness of individuals and diminished reproductive success, as well as lost or diminished habitat quality. As discussed in Section 3.6.3.4.3 (Proposed Mitigation Measures), the Navy and ORNG are proposing to compensate for unavoidable effects on Washington ground squirrel habitat within the MPMGR and CLFR range footprints and 140 dBP contours through habitat restoration and enhancement in other areas on NWSTF Boardman. The adaptive management and monitoring process described in Section 3.6.3.4.4 (Adaptive Management and Monitoring) would be used to reduce uncertainty associated with potential effects of noise outside the 140 dBP contours. Noise associated with Alternative 2 may affect, and is likely to adversely affect the Washington ground squirrel.

3.6.3.3.2 Ground Disturbing Activities and Habitat Alteration

Construction Activities

Site excavation, grading, and equipment operations during construction of the proposed range enhancements for Alternative 2 would result in temporary disturbances to the ground surface (see Table 2-5 and Figure 2-3). The area of disturbance for individual construction projects would range from less than 1 to 30 ac. (less than 0.4 to 12 ha). The total area of disturbance would be about 65 ac. (26 ha) (0.1 percent of NWSTF Boardman), 25 ac. (10 ha) of which have been previously disturbed (mostly consisting of existing gravel or dirt roads) (see Table 2-5). Approximately 40 ac. (16 ha) of previously undisturbed areas would be affected, about 25 ac. (10 ha) would be permanently converted to development, and about 15 ac. (6 ha) would be temporarily disturbed and revegetated. Construction activities for the range enhancements would be spaced over a period of several years as funding becomes available. Therefore, the total area of disturbance at any given time during construction would be much less than 65 ac. (26 ha).

Under Alternative 2, a second CLFR (western CLFR) would be constructed and the Joint-Use Range Operations Support Center would be constructed as a standalone building. However, the DMPTR would not be constructed under Alternative 2. Therefore, the total area of disturbance for Alternative 2 would be 27 ac. (11 ha) less than Alternative 1 (from 92 ac. [37 ha] to 65 ac. [26 ha]). The area permanently converted to development under Alternative 2 would be 24 ac. (10 ha) less than Alternative 1 (from 49 ac. [20 ha] to 25 ac. [10 ha]). Construction of the western CLFR would include placement of additional gravel on about 12 ac. (4.9 ha) of existing gravel road, but previously undisturbed areas would not be affected. MPs for Alternative 2 would be the same as those described for Alternative 1.

As noted above, approximately 25 ac. (10 ha) would be permanently converted to development under Alternative 2. Wildlife habitat in these areas would be permanently lost. The area of permanently lost habitat would be small relative to the total land area at NWSTF Boardman (about 0.05 percent). Approximately 15 ac. (6 ha) temporarily disturbed during construction would be revegetated and maintained in accordance with the proposed post-construction restoration plan (Appendix F, Additional Biological Information). After restoration, disturbed areas could provide foraging habitat for Washington ground squirrels and special status birds, as well as nesting habitat. Restoration efforts would include establishment of native plants. Foraging habitat quality could be improved in temporarily disturbed areas that were dominated by invasive plants prior to disturbance, if these areas are not subject to further disturbance during operation of the ranges (see analysis below for training and maintenance activities). The suitability of temporarily disturbed and restored areas for burrowing habitat would depend on the level of disturbance. For example, the natural soil profile would be altered in areas subject to grading or trenching activities. It is unlikely that these areas would be suitable for burrowing for several years following construction. Therefore, a long-term, but not permanent, loss of wildlife habitat would occur in temporarily disturbed and restored areas.

Training Activities

As shown in Tables 2-1, 2-2, and 2-3, the training activities conducted under Alternative 2 would be the same as Alternative 1 with three exceptions: (1) the DMPTR would not be constructed, (2) non-explosive practice mortar rounds would be fired into the Main Target Area, and (3) half of the CLFR training events would shift from the eastern CLFR to the western CLFR. These activities would result in a decrease in the area of disturbance associated with training activities compared to Alternative 1. Ground disturbance from use of the mortar firing points would be negligible. Additional vegetation disturbance would occur under Alternative 2 around the target emplacements along the western CLFR, but there would be no disturbance associated with the DMPTR. The MPs for Alternatives 1 and 2 would be the same.

Maintenance Activities

Maintenance activities around targets in the Main Target Area under Alternative 2 would be the same as those described for the No Action Alternative and Alternative 1. As discussed for Alternative 1, the proposed modifications to the fire break system (Figure 3.13-3) could result in long-term benefits to wildlife habitat at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible. Maintenance activities for the MPMGR and the eastern CLFR would be the same as Alternative 1. Similar maintenance would also be required along the western CLFR, which would be established under Alternative 2. The DMPTR would not be constructed and operated under Alternative 2; therefore, the overall area affected by target maintenance would be less than Alternative 1.

Invasive Plants

As discussed above, ground disturbances associated with construction and training activities under Alternative 2 would decrease compared to Alternative 1 because the DMPTR would not be constructed and operated. The corresponding indirect effects from invasive plants would also decrease. Mortar firing points and the western CLFR would be in use under Alternative 2, but the overall activity footprint would be smaller than Alternative 1. Nonetheless, the activity footprint would be larger than the No Action Alternative and this would provide additional pathways for invasive plant seed dispersal at NWSTF Boardman, thus increasing the potential for infestations. As discussed for Alternative 1, several MPs would be implemented to avoid invasive plant infestations, monitor invasive plants, and adaptively manage invasive plants. The same invasive plant management approach would be used under Alternatives 1 and 2.

Wildfire

As discussed in Section 3.13 (Wildfire), the proposed increases in training under Alternative 2 at NWSTF Boardman could increase the risk of wildfire, but the risk would be lower than Alternative 1 because the DMPTR would not be constructed and operated.

Fires resulting from training activities would be expected to occur on the MPMGR, and the eastern and western CLFRs under Alternative 2, particularly during dry periods. However, the area burned is expected to be relatively small based on implementation of the *Draft Integrated Wildland Fire Management Plan* (Appendix H). Wildfires would result in short- and long-term effects on wildlife habitat under Alterative 2. The effects would be localized based on implementation of the *Draft Integrated Wildland Fire Management Plan*. Wildfires caused by training activities under Alternative 2 would have no significant impacts on vegetation.

Summary and Combined Effects on Wildlife Habitat

This section provides a summary of the analyses presented above and synthesizes this information to consider the overall effects of Alternative 2 on wildlife habitat. Consideration of the combined effects on habitat provides a better understanding of potential population-level effects and helps to define the scope of proposed habitat restoration and enhancement efforts to mitigation adverse effects.

As summarized in Table 3.6-13, Alternative 2 would result in permanent habitat loss and long-term habitat degradation. Permanently lost habitat includes areas that would be converted to structures or facilities such as the UAS airfield, gravel roads, and targets. Complete loss of habitat functions and values would occur in these areas. Long-term habitat degradation, but not complete loss of habitat functions and values, is expected to occur in areas affected by temporary construction disturbance, projectiles striking the ground, training-caused wildfires, invasive plants, weapons firing noise on the MPMGR and CLFRs, and general disturbance caused by increased human activity. The spatial extent of habitat impacts associated with these stressors cannot be fully quantified. However, based on implementation of MPs discussed in Section 3.6.3.4.2 (Proposed Management Practices), the Navy and ORNG expect that long-term habitat degradation would primarily occur within the range enhancement footprints. One exception would be the 140 dBP contours for the MPMGR and CLFRs, 33 ac. (13.4 ha) of which fall outside the range footprints (see Figure 3.6-13). Therefore, the area of long-term habitat degradation for the MPMGR and CLFRs was calculated as follows: (total range footprint – permanently lost habitat) + area of 140 dBP contour outside the range footprint. Figure 3.6-14 shows the total affected area for the MPMGR and CLFRs. Table 3.6-13 provides a summary of permanent habitat loss and long-term habitat degradation for each range enhancement, broken down by ecological condition class.

The area of permanently lost habitat would be 25 ac. (10 ha) and long-term habitat degradation is expected on 561 ac. (227 ha), for a total affected area of 586 ac. (237 ha). Approximately 90 percent of the affected area is known to be historically occupied Washington ground squirrels. However, based on the lack of recent, systematic survey data, the entire affected area was assumed to be occupied by Washington ground squirrels for impact assessment and mitigation planning purposes. Assuming that the entire NWSTF Boardman property is suitable Washington ground squirrel habitat, 0.05 percent of the available habitat would be permanently lost and 1.2 percent would be degraded. Quantifying the population-level effects of these habitat impacts is not possible given the current limited knowledge of Washington ground squirrel population dynamics. While squirrel numbers could decline in response to lost and degraded habitat, the area affected would be relatively small compared to the total habitat available at NWSTF Boardman. Therefore, it is unlikely that the viability of the population would be threatened. Large areas of historically occupied habitat would be unaffected by the action. In addition, the proposed habitat mitigation measures discussed in Section 3.6.3.4.3 (Proposed Mitigation Measures) would help to ensure no net loss of habitat quantity or quality and a net benefit to Washington ground squirrel habitat. Proposed activities that would result in habitat loss or degradation may affect, and are likely to adversely affect the Washington ground squirrel.

Table 3.6-13: Summary of Habitat Impacts for Proposed Range Enhancements at Naval Weapons Systems Training Facility Boardman under Alternative 2

Range Enhancement and Ecological Condition Classification of Affected Habitat	Permanent Habitat Loss (acres)	Long-term Habitat Degradation (acres)	Total (acres)
Multipurpose Machine Gun Range			
High	0	0	0
Medium-high	0	0	0
Medium	8	193	201
Medium-low	8	6	14
Low	0	0	0
Unclassified	0	20	20
Subtotal =	16	219	235
Eastern Convoy Live Fire Range			
High	0	0	0
Medium-high	0	8	8
Medium	0	97	97
Medium-low	0	6	6
Low	0	2	2
Unclassified	0	2	2
Subtotal =	0	113	113
Western Convoy Live Fire Range			
High	0	0	0
Medium-high	0	5	5
Medium	0	146	146
Medium-low	0	14	14
Low	0	0	0
Unclassified	0	63	63
Subtotal =	0	228	228
Demolition Training Range			
High	0	0	0
Medium-high	0	0	0
Medium	1	0	1
Medium-low	0	0	0
Low	0	0	0
Unclassified	0	0	0
Subtotal =	1	0	1
Unmanned Aircraft Systems Airfield and Maintenance Facility and Range Operations and Control Center			
High	0	0	0
Medium-high	0	0	0
Medium	0	0	0
Medium-low	0	0	0
Low	8	1	9
Unclassified	0	0	0
Subtotal =	8	1	9
Total for All Range Enhancements			
High	0	0	0
Medium-high	0	13	13
Medium	9	435	444
Medium-low	8	26	34
Low	8	3	11
Unclassified	0	84	84
Total =	**25**	**561**	**586**

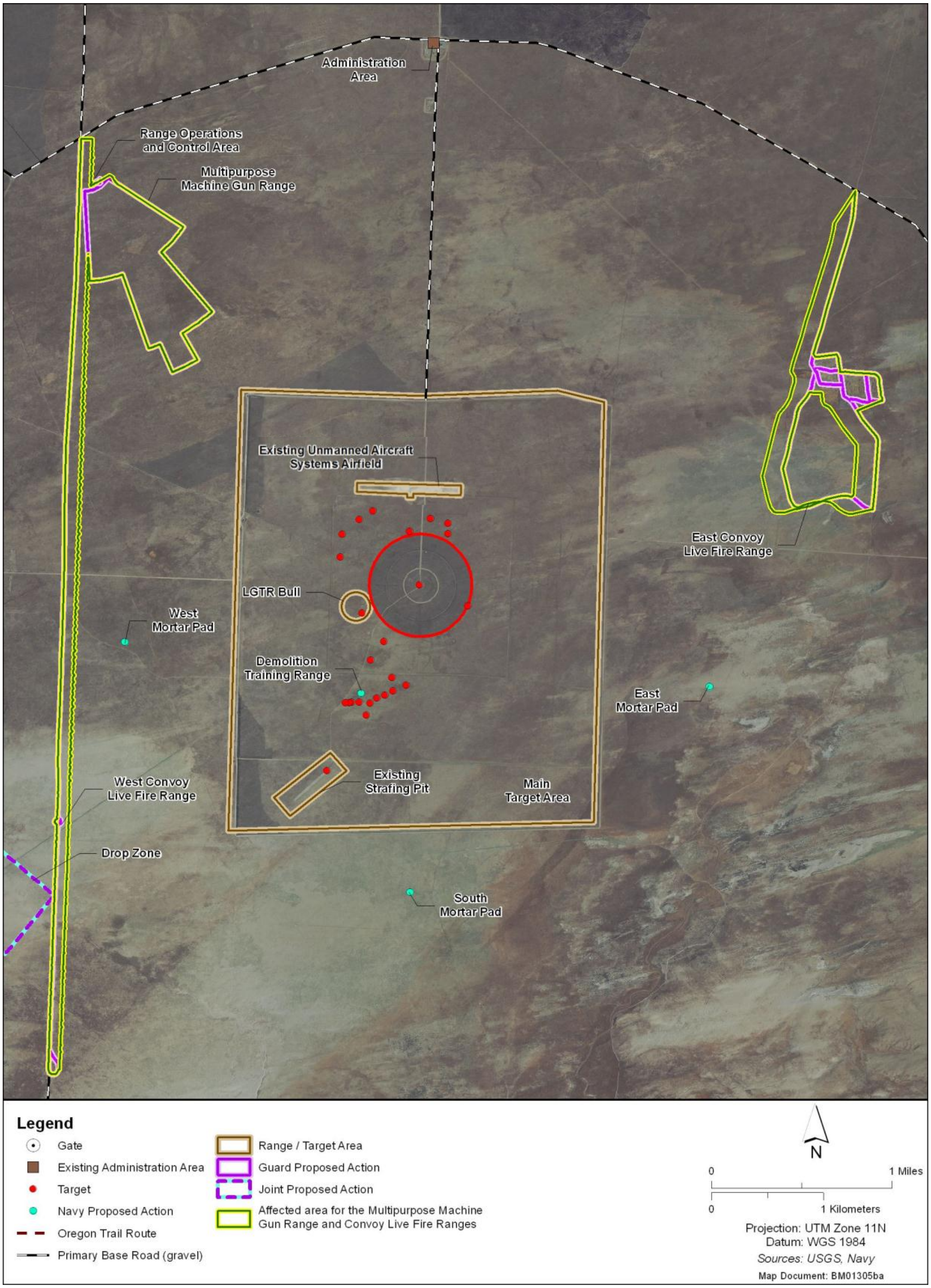

Figure 3.6-14: Area of Habitat Affected by the Multipurpose Machine Gun Range and Convoy Live Fire Ranges – Alternative 2

Nesting habitat for grasshopper sparrows, long-billed curlews, and western burrowing owl would also be affected. Given the size of the area of disturbance relative to other available habitats at NWSTF Boardman, impacts on bird habitat under Alternative 2 are not expected to adversely impact bird populations. The effects on northern sagebrush lizard habitat would be negligible under Alternative 2 because sagebrush lizard habitats do not co-occur with the proposed range enhancements. Long-term benefits associated with fire break restoration (219 ac. [89 ha]) would help to offset impacts on wildlife habitat from construction activities.

3.6.3.3.3 Physical Strikes

Although the sources of physical strike hazards for wildlife species are the same under Alternative 2 as the No Action Alternative (non-explosive practice munitions, aircraft, and vehicles), Alternative 2 calls for an increase in training activities, new training activities, and range enhancements requiring construction. By increasing use, introducing new activities, and constructing new range capabilities outside of the Main Target Area, wildlife exposure to sources of physical strike would increase under Alternative 2 compared to the No Action Alternative. Much of the analysis presented for Alternative 1 is applicable to Alternative 2 because training activities would be similar with the following changes: the DMPTR would not be constructed and operated, mortar firing points would be established and non-explosive practice mortars would be fired, and a second CLFR (western CLFR) would be established. Approximately 50 percent of the small arms rounds expended on the eastern CLFR under Alternative 1 would be expended on the western CLFR under Alternative 2.

Non-explosive Practice Munitions Strikes

The number of non-explosive practice bombs dropped in the Main Target Area under Alternative 2 would be the same as the No Action Alternative, but small- and medium-caliber rounds would increase from about 57,250 to 803,800 per year (see Table 2-3). The potential for incidental strikes would increase, but factors discussed for the No Action Alternative, such as animals leaving the immediate area in response to various stimuli, would still reduce the overall chance of a strike and the likelihood of a relatively small projectile and an animal co-occurring in time and space within the target area is expected to be low. The risk of non-explosive practice munitions strikes would decrease under Alternative 2 compared to Alternative 1 because the DMPTR would not be constructed and operated. The 120 mm and 25 mm rounds would not be fired at NWSTF Boardman under Alternative 2, and the number of small-caliber rounds would decrease from 1,708,800 to 803,800 per year.

Based on the factors discussed for Alternative 1, the risk of non-explosive practice munitions striking wildlife would also be low under Alternative 2. If strikes did occur, a limited number of individuals would be affected, and no population-level effects would be expected. For compliance purposes, the Navy and ORNG estimate that up to six Washington ground squirrel incidental mortalities could occur per year from a combination of non-explosive practice munitions strikes and vehicle strikes under Alternative 2. Range control personnel would inspect the target locations at the conclusion of a firing exercise to record and report any mortality. Non-explosive practice munitions strikes would have no significant impacts on wildlife under Alternative 2. Non-explosive practice munitions strikes under Alternative 2 may affect, and are likely to adversely affect the Washington ground squirrel.

Aircraft Strikes

The proposed increases in aircraft and UAS sorties under Alternative 2 increases the chances of bird-aircraft strikes occurring relative to the No Action Alternative, but the risk level would remain relatively low because NWSTF Boardman does not have a fixed-wing aircraft runway and no specific bird-aircraft strike hazard concentrated risk areas have been identified. The proposed UAS airstrip would be evaluated for bird-aircraft strike risks before it becomes operational and appropriate risk reduction measures would be implemented, if necessary.

The potential for incidental bird mortality from aircraft strikes exists in the NWSTF Boardman airspace. If they occur, bird-aircraft strikes would be infrequent and a small number of individuals would be affected. No population level effects would be expected based on the small number of individuals potentially affected. Aircraft strikes that might occur under Alternative 2 would have minor localized effects on birds and are not expected to affect mammals, amphibians, or reptiles. Aircraft strikes would have no effect on the Washington ground squirrel under Alternative 2.

Vehicle and Equipment Strikes

Vehicle and equipment use would increase substantially under Alternative 2 during ground-based training events and during construction compared to the No Action Alternative. However, the risk of vehicle strikes would decrease compared to Alternative 1 because the DMPTR would not be constructed and operated. Vehicles, including tracked vehicles, would continue to use existing roads or new gravel roads constructed under Alternative 2. No off-road maneuver training is proposed. Maximum travel speeds would be limited during training, but the potential exists for Washington ground squirrels and other wildlife to be struck along roads used during training. During construction, vehicle use would be confined to existing roads to the extent possible, but construction equipment would require access to off-road areas to accomplish the work. The potential for wildlife strikes also exists during fire break and target maintenance activities. As discussed in Section 3.6.3.2.2 (Ground Disturbing Activities and Habitat Alteration), fire break maintenance activities would decrease substantially under Alternative 2. The MPs listed for Alternative 1 would also be implemented under Alternative 2 to avoid and minimize the risk of strikes.

Although the risk of vehicles or equipment striking a Washington ground squirrel and other wildlife cannot be eliminated, the MPs listed for Alternative 1 would also minimize risk under Alternative 2. If strikes did occur, a limited number of individuals would be affected, and no population level effects would be expected. For compliance purposes, the Navy and ORNG estimate that up to six Washington ground squirrel incidental mortalities could occur per year from a combination of non-explosive practice munitions strikes and vehicle strikes under Alternative 2. Range control personnel would inspect the training area, including target areas and heavily travelled roads, at the conclusion of a ground-based training exercise to record and report any mortality. Vehicle and equipment strikes under Alternative 2 would have minor localized effects on wildlife. Vehicle and equipment strikes may affect, and are likely to adversely affect the Washington ground squirrel under Alternative 2.

3.6.3.3.4 Electromagnetic Radiation

Alternative 2 calls for the increase in electronic warfare training events from 193 to 500 events per year, relative to the No Action Alternative (see Table 2-1). Wildlife would be exposed to various forms of electromagnetic sources including radar, threat transmitters, communications equipment, and electronic detection equipment, primarily during electronic warfare training events. The increase in electronic warfare training, relative to the No Action Alternative, may increase exposures to individual animals. The effects of this radiation on wildlife cannot be quantified, however, the effects can be expected to be minor for the following reasons: (1) the sources of electromagnetic radiation included in Alternative 2 do not expose wildlife species to constant radiation (in other words, no area of NWSTF Boardman is continuously saturated with electromagnetic fields), and (2) beams of electromagnetic radiation (e.g., from radars) may expose birds in flight to increased levels of radiation; however, the birds in flight would be moving through an area and potentially out of airspace of the main beam.

Under Alternative 2, the intensity of electromagnetic effects on wildlife species may be considered minor, where the animal would experience a detectable response to an electromagnetic field, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected by electromagnetic fields generated from sources included under Alternative 2. Electromagnetic fields may affect, but are not likely to adversely affect the Washington ground squirrel under Alternative 2 because the effects would be insignificant.

3.6.3.3.5 Lasers

Under Alternative 2, laser guided munitions would be used during A-G BOMBEXs within the Main Target Area. The use of laser-guided munitions under Alternative 2 would be the same as under the No Action Alternative. The DMPTR would not be constructed under Alternative 2; therefore, laser optics and designators proposed for use on the DMPTR under Alternative 1 would not be required for Alternative 2. However, the anticipated effects of laser use under Alternative 2 would be the same as under the No Action Alternative.

Under Alternative 2, the intensity of effects of lasers on wildlife species may be considered minor, where the animal may experience a detectable response to a laser beam, but would recover after the exposure. The fitness (physiological health and normal behavior) of individual animals would not be affected under Alternative 2. The use of lasers may affect, but is not likely to adversely affect the Washington ground squirrel under Alternative 2 because the effects would be insignificant.

3.6.3.3.6 Summary and Combined Effects of All Stressors under Alternative 2

Potential impacts on wildlife would increase substantially under Alternative 2 compared to the No Action Alternative, but would decrease compared to Alternative 1 because the DMPTR would not be constructed and operated. Potential impacts would primarily be associated with construction of the proposed range enhancements and use of the new ranges. Wildlife would be temporarily displaced during construction and some individuals could be injured or killed during construction. If construction activities commenced during the breeding season, a primary concern would be displacement of birds and diminished reproductive success of grasshopper sparrows, western burrowing owls, and long-billed curlews. Therefore, MPs include starting construction activities outside of the breeding season. Construction would result in permanent loss of approximately 25 ac. (10 ha) of wildlife habitat to development, temporary disturbance to approximately 15 ac. (6 ha) of wildlife habitat, and fragmentation of wildlife habitat. The area of permanently lost habitat would be small relative to the total land area at NWSTF Boardman (about 0.05 percent). Temporarily disturbed areas would be susceptible to invasive plant infestations, but these impacts would be addressed through post-construction restoration efforts (Appendix F). Displaced wildlife would likely repopulate the immediate area following construction.

Following construction and restoration, wildlife using habitats on and in the vicinity of the new ranges would be exposed to stressors associated with new training activities, including noise associated with weapons firing on the MPMGR and CLFRs, and detonation of high-explosive charges on the DTR. Substantial increases in vehicle use and general disturbance associated with human activities would also occur. Required target maintenance and projectiles impacting target emplacements would result in ground disturbance, which could result in long-term localized impacts on wildlife habitat.

As discussed in the noise analysis presented above for Alternative 2 (see Section 3.6.3.3.1, Noise), portions of NWSTF Boardman would be exposed to weapons firing and explosive detonation noise occurring on the new ranges. Noise exposure would be intermittent because the MPMGR and CLFRs would primarily be used on weekends and the DTR would be used about 15 times per year. Some wildlife species may avoid or minimize noise exposure by leaving or avoiding the immediate area in response to activities that take place prior to weapons firing or detonation.

Nonetheless, wildlife could potentially be exposed to loud noise that could affect hearing and elicit physiological and behavioral responses in individuals. Such responses could reduce the fitness and reproductive success of individuals that use habitats in the vicinity of the loudest and most frequent noise sources (weapons firing on the MPMGR and eastern CLFR). Special status species most likely to be affected include the Washington ground squirrel, grasshopper sparrow, western burrowing owl, and long-billed curlew. The effects are expected to occur in the vicinity of the new ranges and not extend into the southern portions of NWSTF Boardman or onto adjacent undeveloped lands.

While scientific limitations preclude quantification of population-level effects, it is possible that the Washington ground squirrel population at NWSTF Boardman could decline in response to the combined effects of construction activities and noise under Alternative 2. Population declines could result from reduced fitness of individuals and diminished reproductive success, as well as lost or diminished habitat quality. These impacts are not expected to occur in the southern portion of NWSTF Boardman or on the adjacent undeveloped lands.

As summarized in Table 3.6-14, impacts on wildlife under Alternative 2 would be substantially less than Alternative 1. Nonetheless, Alternative 2 may have significant impacts on wildlife, because local declines in Washington ground squirrel population could occur. Although not required by ESA, the Navy and ORNG (acting as the NGB's agent) engaged in early conferencing with the USFWS to address impacts on the Washington ground squirrel and develop conservation measures to avoid, minimize, and mitigate impacts on this candidate species. The USFWS issued a Conference Opinion for the Preferred Alternative (Alternative 2) on December 2, 2013 (Appendix B, Regulatory Correspondence). The MPs, mitigation measures, monitoring, and adaptive management process detailed in Section 3.6.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures) reflect conservation measures contained in the Conference Opinion. No population level effects or significant impacts are expected for other mammals, birds, or reptiles.

Table 3.6-14: Comparison of Impacts for Alternatives 1 and 2

Impacts	Affected Area (acres)	
	Alternative 1	Alternative 2
Total area of disturbance from construction	92	65
Habitat permanently lost to construction	50	25
Area exposed to 140 dBP weapons firing noise	1,208	412
Total affected area (range footprint plus 140 dBP weapons firing noise outside the footprints)	1,763	586

Note: dBP = peak decibels

3.6.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.6.3.4.1 Introduction

The Navy and ORNG incorporate measures that are protective of the environment into all of their activities. Environmental Management Systems provide a formal management framework to help achieve environmental goals through repeatable and consistent control of operations. Compliance with environmental regulations and associated DoD, Navy, and ORNG policies is accomplished through a variety of well-established programs and related plans, processes, and procedures. The intention of mitigation is to reduce the adverse effects of an action on the environment, utilizing one of the five following methods:

- Avoiding the impact altogether
- Minimizing impacts
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action
- Compensating for the impact by replacing or providing substitute resources or environments

The process of identifying ways to reduce potential environmental effects of the Proposed Action started early in planning process for the proposed range enhancements and will continue through discussions with the USFWS and ODFW. For example, sensitive resources were identified during development of conceptual plans for the proposed range enhancements, and the proposed ranges were sited to avoid sensitive resources and reduce surface disturbance and site development requirements to the extent possible. In addition, several existing Navy and ORNG environmental programs and plans include established procedures, practices, or management actions that would avoid, minimize, or rectify potential impacts of the Proposed Action. In accordance with DoD, Navy, and ORNG policies, these plans are reviewed and revised on a regular basis and would be updated to reflect changes at NWSTF Boardman if the Proposed Action were implemented.

Accordingly, impact avoidance, minimization, and rectification measures are addressed in this EIS within the framework of existing Navy and ORNG environmental programs and plans, where appropriate. For the purposes of this EIS, measures that avoid, minimize, or rectify potential impacts are referred to as proposed MPs. Where appropriate, MPs would be incorporated into construction contracts to facilitate implementation. The Navy and ORNG also currently employ standard practices or SOPs to provide for the safety of personnel and equipment, as well as the success of the training and testing activities. In many cases, SOPs result in incidental environmental, socioeconomic, and cultural benefits, but they serve the primary purpose of providing for safety and mission success, and are implemented regardless of their secondary benefits. Implementation of both MPs and SOPs has been considered in the analysis presented in this section.

If the analyses indicated that potential impacts could not be avoided, minimized, or rectified to an acceptable level by implementing MPs, additional measures were developed to reduce or eliminate the impact over time or compensate for the impact by replacing or providing substitute resources or environments. These additional measures are referred to as proposed mitigation measures in this EIS.

The Navy and ORNG also propose an adaptive management and monitoring process to help reduce uncertainty associated with the anticipated effects of the action and the anticipated effectiveness of the proposed MPs and mitigation measures. Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process (Williams et al. 2009). The *NWSTF Boardman INRMP* currently provides a mechanism to adaptively manage natural resources cooperatively with USFWS and ODFW. If a decision is made to implement the Proposed Action, commitments to fund and implement specific MPs, mitigation measures, and an adaptive management process would be made in the Record of Decision. As each individual proposed action is funded and constructed, mitigation measures and adaptive management of the area involved with that action would be implemented. The INRMP would continue to provide the overall management structure for implementing adaptive management. After the Record of Decision is signed, the INRMP would be updated to include applicable commitments made in the Record of Decision, including monitoring and mitigation. The INRMP would continue to be reviewed and updated annually through natural resources metrics meetings with USFWS, ODFW, and other stakeholders. This process will help to ensure that a comprehensive and consistent approach to adaptive management and monitoring is accomplished for the entire NWSTF Boardman property.

3.6.3.4.2 Proposed Management Practices

The current MPs contained in the *NWSTF Boardman INRMP* and other applicable plans would continue to be implemented, and existing programs and plans would be updated to reflect new conditions. The following additional MPs would be implemented to avoid and minimize potential impacts under the Proposed Action:

- Applicable erosion control measures would be implemented during construction to avoid and minimize the potential for wind and water erosion in accordance with the Oregon Department of Environmental Quality *Erosion and Sediment Control Manual* (Oregon Department of Environmental Quality 2005).
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- Under the Navy's Range Sustainability Environmental Program Assessment (RSEPA), Range Condition Assessment 5-year Reviews would continue to be conducted and appropriate steps would be taken to analyze environmental conditions on the range and to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose risks to human health or the environment. RSEPA focus would be expanded to incorporate new range activities and new training areas under periodic assessments.
- Assessments would be conducted for the DMPTR (under Alternative 1), the MPMGR, and both CLFRs in accordance with the Army's Operational Range Assessment Program. These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways exist for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual*.
- Project specific monitoring would be conducted during the project design phase to identify existing habitat, evaluate habitat quality, and identify wildlife currently using these habitats. This information would be used during project design to support micrositing decisions. Areas of higher quality habitat (e.g., undisturbed areas with a relatively high percentage of native plant cover) or high wildlife use (e.g., existing Washington ground squirrel burrows) would be avoided in favor of areas of lower quality habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent practicable. Micrositing efforts would be limited to buildings and structures, as opposed to targetry or other range components, because even minor changes to the range design could affect the associated surface danger zone or impact

range safety in other ways. The survey data would also be used to support post-construction restoration efforts.

- Habitat temporarily disturbed during construction would be restored in accordance with the proposed post-construction restoration plan (Appendix F, Additional Biological Information). The restoration plan would be implemented by the ORNG in accordance with the Host-Tenant Agreement and Inter-Service Support Agreement that would be updated prior to implementing the proposed action.
- The MPs contained in the *NWSTF Boardman INRMP* and other applicable plans that are relevant to Washington ground squirrel conservation would continue to be implemented.
- Invasive plants would continue to be managed and controlled under the *NWSTF Boardman INRMP*, with an increase in control effort to reflect new threats introduced by the Proposed Action. The Plan would be updated in cooperation with ORNG, USFWS, and ODFW, during routine annual reviews to reflect the evolving invasive plant management situation associated with construction and operation of the new ranges. Updates to the Plan would include provisions for short- and long-term monitoring of invasive plants; responsibilities and procedures for integrating efforts of the Navy, ORNG, and The Nature Conservancy; criteria for prioritizing management actions and adaptive management strategies to control invasive plants; and annual work plans, including funding requirements and funding sources. After ranges become operational, qualitative surveys would be conducted annually within the range footprint to detect noxious weeds (Morrow County list of noxious weeds) within the identified affected areas. The purpose of these surveys is to detect noxious weeds so that they can be controlled immediately, most likely through targeted application of a glyphosate herbicide. Surveys would continue indefinitely, and controls would be implemented as necessary.
- The *NWSTF Boardman Draft Integrated Wildland Fire Management Plan* (Appendix H) would be finalized and implemented. In addition to other fire protection measures, the Plan includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created. The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.
- Explosive detonations, pyrotechnics, and live fire are not conducted when the fire danger rating is unacceptable based on the Fire Danger Rating and Wildland Fire Risk Management Matrix contained in the *NWSTF Boardman Draft Integrated Wildland Fire Management Plan* (Appendix H), unless approved by the Commanding Officer, Naval Air Station Whidbey Island. Explosive demolition training is not normally scheduled from June through September to minimize wildfire risk.
- Demolition Training Range training MPs include:
    - Conducting training during days when the weather is favorable. Studies have shown that variation of temperature and wind velocity with altitude can cause a noise event to be inaudible at one time (favorable) and audible at another time (unfavorable). A number of factors affect noise propagation during training events, and are considered by range managers and users when planning and conducting activities to help mitigate noise impacts. Conditions that can enhance the propagation of sound include steady winds;

clear days on which "layering" of smoke, fog, or clouds are observed; cold, hazy or foggy mornings; large temperature swings on the previous day; and high barometer/low temperatures. These conditions are avoided to the maximum extent possible when scheduling explosive detonation training.

  - Charges greater than 50 lb. (22.7 kg) NEW would not be detonated from January to August to avoid and minimize noise impacts on Washington ground squirrels and nesting birds, unless necessitated by operational or disposal requirements.
  - To help reduce noise levels for training with charges of 100 lb. (45.4 kg) NEW or greater, additional MPs include: training during times with optimal weather conditions to attenuate noise, burying the explosive charge, or bunkering the charge with sand bags.

- On NWSTF Boardman, to improve vehicle operation safety, be protective of wildlife, and reduce dust emissions, the vehicle speed limit for the range is 25 mph (40 kph) unless otherwise posted; however, emergency situations, operational necessities, and certain training events may require vehicle speeds to exceed this standard speed limit. At all times on the range, vehicle operators shall use extreme caution and operate at a slow, safe speed consistent with the mission, safety, and current road and environmental conditions. Vehicle operators shall be cognizant and protective of pedestrians and wildlife while conducting all range activities.
  - The only road posted above 25 mph (40 kph) is the Admin Main road from the main gate access to the range from Bombing Range Road to the on-range road known as "The Interstate." Speed limit on the Admin Main Road is 30 mph (48 kph).
  - It is not expected that training requirements will require speeds in excess of 25 mph (40 kph) on a routine basis; however in some training events, vehicles need to be able to react to changing tactical situations in training as they would in actual combat. Training differently than that which would be needed in an actual combat scenario would decrease training effectiveness and reduce the crew's abilities. During these activities, the 25-mph (40 kph) speed limit may need to be exceeded for brief periods.

3.6.3.4.3 Proposed Mitigation Measures

The proposed MPs described above would be implemented to avoid, minimize, and rectify impacts on natural resources. Nonetheless, the analysis presented in this section indicates that the Preferred Alternative (Alternative 2) would result in unavoidable impacts on historically occupied Washington ground squirrel habitat. Therefore, mitigation measures would be implemented to compensate for these unavoidable impacts from the Preferred Alternative, as described in the Final Conferencing Opinion with USFWS. The mitigation goal is no net loss of habitat quantity or quality, and to provide a net benefit of habitat quantity or quality, which would be achieved through in-kind and in-proximity habitat restoration and enhancement.

Despite being one of the largest remaining blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia Plateau Ecoregion, non-native plant species invasions have degraded plant communities and wildlife habitat at NWSTF Boardman. Lightning-caused wildfire, historic livestock grazing, plowing, and other land uses have contributed to the spread of non-native plant species on NWSTF Boardman. Non-native plant species were identified as one of the greatest threats to the Boardman Grasslands (Kagan et al. 2000), because they replace native vegetation and degrade wildlife habitat.

In particular, cheatgrass (*Bromus tectorum*) is a serious threat because it alters natural fire regimes by creating more abundant and continuous fine fuels (fast-drying fuel that is rapidly consumed by fire when dry) that can result in more intense, larger, and frequent fires. Intense fires that burn through high-quality native habitats can convert a diverse multi-story habitat of cryptogams, perennial grasses and forbs, and shrubs to a monoculture of cheatgrass and other invasive species that is difficult to reverse without active restoration (Elseroad 2007). Since 1998, more than 85 percent of NWSTF Boardman has been burned by wildfires, which have caused short- and long-term habitat alterations. Cheatgrass is a factor that has contributed to the intensity, size, and frequency of wildfires at NWSTF Boardman.

Restoring habitats on NWSTF Boardman that have been degraded by wildfire, non-native invasive plants, plowing, and other causes offers opportunities for in-kind and in-proximity habitat mitigation. Successful restoration or enhancement efforts on ample acreage at NWSTF Boardman could increase available native habitat for the Washington ground squirrel and other wildlife, decrease the frequency and intensity of wildfire, and improve long-term stability of the ecosystem, thus ensuring no net loss and a net benefit of habitat quantity and quality at NWSTF Boardman.

Although not required under ESA, the Navy and ORNG (acting as the NGB's agent) engaged in early conferencing with the USFWS to address impacts on the Washington ground squirrel and develop conservation measures to avoid, minimize, and mitigate impacts on this candidate species. Proposed mitigation measures are based on the outcome of the conference process and are provided in the Conference Opinion issued by USFWS on December 2, 2013 (Appendix B, Regulatory Correspondence).

3.6.3.4.4 Adaptive Management and Monitoring

Introduction

Adaptive management is a decision process (Figure 3.6-15) that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. Adaptive management requires stated management objectives to guide decisions about what to try, and explicit assumptions about expected outcomes to compare against actual outcomes. It is important to know what the available management options and alternative assumptions are, in case the action that is tried does not work as expected (Williams et al. 2009).

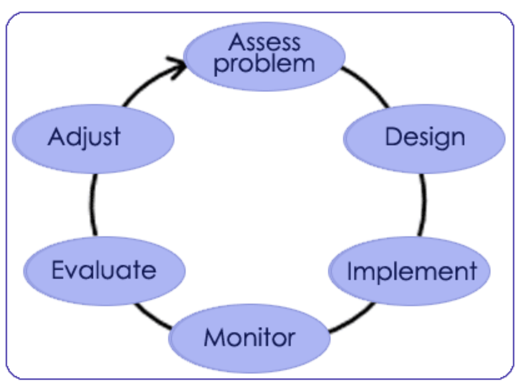

Figure 3.6-15: Adaptive Management Process

This section outlines the Navy and ORNG's proposed adaptive management process that would be used to help reduce uncertainty associated with the anticipated effects of the action and the anticipated effectiveness of the proposed MPs and mitigation measures. As discussed above, the *NWSTF Boardman*

INRMP currently provides a mechanism to adaptively manage natural resources cooperatively with USFWS and ODFW. If a decision is made to implement the Proposed Action, specific commitments to an adaptive management process would be made in the Record of Decision. These commitments would be incorporated into the INRMP, and the INRMP would continue to provide the overall management structure for implementing adaptive management. This management structure includes a requirement to review and update the INRMP annually through natural resources metrics meetings that include the USFWS and ODFW. The remainder of this section and the Conference Opinion (Appendix B, Regulatory Correspondence) outline the proposed adaptive management process, including expected outcomes and uncertainties, management objectives and decision points, monitoring, and alternative management actions.

Expected Outcomes and Uncertainties

Adaptive management requires explicit assumptions about expected outcomes to compare against actual outcomes (Williams et al. 2009). The anticipated effects of the action and associated uncertainties are analyzed in detail in Section 3.6.3 (Environmental Consequences). Following is a very brief summary of the expected outcomes of implementing the Preferred Alternative, including the proposed MPs and mitigation measures:

- Proposed range construction and military readiness activities would result in permanent habitat loss (25 ac. [10 ha]) and long-term habitat degradation (788 ac. [319 ha]). Washington ground squirrel use of the affected area would decline, foraging and breeding would be adversely affected, and the Washington ground squirrel population on NWSTF Boardman could decline. Uncertainties that can be addressed through adaptive management include the possibility that impacts could be overestimated or underestimated.
- MPs would avoid and minimize impacts. Mitigation measures (habitat restoration and enhancement) would compensate for lost habitat functions and values and provide a net benefit. Ecosystem stability would improve in restored/enhanced areas, and Washington ground squirrels would persist and possibly increase in numbers in these areas. Uncertainties that can be addressed through adaptive management include the effectiveness and benefits gained from the proposed restoration.

Management Objectives and Monitoring

An adaptive approach requires explicit and measurable objectives. Uncertainty about how to achieve objectives is what motivates adaptive management and drives the design of the monitoring system. To address this uncertainty, stakeholders must agree on the objectives (Williams et al. 2009). The management objectives for the Proposed Action are grouped under two broad management goals that are focused on: (1) reducing uncertainties associated with potential impacts of the Proposed Action, and (2) reducing uncertainties associated with the effectiveness and benefits gained by the proposed restoration. Specific management objectives under these broad goals would serve as decision points that could trigger evaluation and adjustment phases of the adaptive management process, based on monitoring. Management objectives and monitoring are provided in the USFWS Conference Opinion provided in Appendix B (Regulatory Correspondence).

Alternative Management Actions

Like any iterative decision process, decision making in adaptive management involves the selection of an appropriate management action at each point in time, given the status of the resources being managed at that time (Williams et al. 2009). Potential alternative management actions for NWSTF Boardman include:

- Review of ongoing training activities to determine if additional measures or MPs, such as seasonal adjustments to training schedules could be implemented to avoid or minimize impacts on the resources of concern while still meeting training and readiness requirements. Additionally, if no effects are observed then the monitoring could be reduced.
- Modify or refine restoration methods. For example, use more aggressive invasive plant controls on restoration sites such as pre-emergent herbicides, alter planting strategies, or restore additional acreage.
- Refine fire prevention and suppression methods.
- Evaluate the feasibility of offsite mitigation by initiating a search for suitable properties to serve as a compensatory mitigation site that could be acquired under the Navy's Readiness and Environmental Protection Initiative or the Army's Compatible Land Use Buffer Program.

3.6.3.5 Summary of Effects and Conclusions

3.6.3.5.1 Endangered Species Act Determinations for the Washington Ground Squirrel

Although not required under ESA, the Navy and ORNG (acting as the NGB's agent) engaged in early conferencing with the USFWS to address impacts on the Washington ground squirrel and develop conservation measures to avoid, minimize, and mitigate impacts on this candidate species. Table 3.6-15 summarizes the Navy's and ORNG's ESA determinations of effect for the Washington ground squirrel using terms commonly applied under ESA and defined in Section 3.6.1.2.1 (Endangered Species Act). The USFWS issued a Conference Opinion on December 2, 2013 (Appendix B, Regulatory Correspondence), concluding that the Proposed Action is not likely to jeopardize the continued existence of the Washington ground squirrel.

Table 3.6-15: Endangered Species Act Determinations of Effect for the Washington Ground Squirrel

Stressors		Endangered Species Act Determination of Effect for the Washington Ground Squirrel Under Alternative 1 or 2
Major Stressor Category	Stressor Type	
Noise	Aircraft	May affect, likely to adversely affect.
	Non-explosive Practice Munitions Impact	May affect, likely to adversely affect.
	Small Arms	May affect, likely to adversely affect.
	Large Arms	May affect, likely to adversely affect.
	Land Demolitions	May affect, likely to adversely affect.
	Vehicles and Equipment	May affect, likely to adversely affect.
Ground Disturbance and Habitat Alteration	Non-explosive Practice Munitions	May affect, likely to adversely affect.
	Target and Fire Break Maintenance	May affect, likely to adversely affect.
	Construction	May affect, likely to adversely affect.
	Habitat Alteration by Wildfire and Invasive Plants	May affect, likely to adversely affect.
Physical Strike	Non-explosive Practice Munitions	May affect, likely to adversely affect.
	Aircraft	No effect.
	Vehicles and Equipment	May affect, likely to adversely affect.
Electromagnetic Fields		May affect, not likely to adversely affect.
Lasers		May affect, not likely to adversely affect.

3.6.3.5.2 Migratory Bird Treaty Act Conclusions

As discussed in Section 3.6.1.2.2, the Migratory Bird Treaty Act prohibits the taking, killing, or possessing of migratory birds or the parts, nests, or eggs of such birds, unless permitted by regulation. The Final Rule authorizing DoD to take migratory birds during military readiness activities was published in the Federal Register on February 28, 2007 (50 C.F.R. Part 21). The Final Rule authorizes incidental take of migratory birds during military training and testing activities that would be conducted under the Proposed Action, but does not authorize incidental take during “non-military readiness activities” such as construction of the new ranges or routine maintenance of targets and fire breaks. Accordingly, conclusions regarding compliance with the Migratory Bird Treaty Act are presented separately for military readiness activities and non-military readiness activities.

The analysis presented in this section indicates that construction activities could result in destruction of migratory bird nests or eggs, or mortality of hatchlings, if birds were nesting in the immediate vicinity of the area of disturbance during construction. In particular, species that are confirmed breeders in annual grass/forb and bunchgrass habitats (see Table 3.6-6), which are most prevalent in the proposed range locations, would be susceptible to these impacts. These species include burrowing owl, grasshopper sparrow, horned lark, killdeer, long-billed curlew, mallard, northern pintail, short-eared owl, and western meadowlark. Therefore, MPs would be implemented to avoid these potential impacts. Construction for each range enhancement would be initiated from September 1 through January 31 to avoid disturbance of nesting migratory birds and ensure compliance with the Migratory Bird Treaty Act. Birds would likely avoid nesting in areas where construction is already underway. If necessary, additional management techniques would be used to deter birds from nesting in the immediate vicinity of an active construction site in coordination with USFWS and ODFW. In addition, migratory bird conservation measures would continue to be implemented under the *NWSTF Boardman INRMP* in accordance with the DoD and USFWS Memorandum of Understanding to Promote the Conservation of Migratory Birds. Non-military readiness activities associated with the Proposed Action would comply with the Migratory Bird Treaty Act.

The Final Rule authorizing the DoD to take migratory birds during military readiness activities provides that the Armed Forces must confer and cooperate with USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a “significant adverse effect” on a population of a migratory bird species. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem. As used here, population means a group of distinct, coexisting, conspecific individuals (i.e., organisms of the same species), whose breeding site fidelity, migration routes, and wintering areas are temporally and spatially stable, sufficiently distinct geographically (at some time of the year), and adequately described so that the population can be effectively monitored to discern changes in its status.

The analysis presented in this section indicates that the combined effects of noise, general human disturbance, and reduced habitat quality associated with military readiness activities could result in reduced fitness of individual birds. In particular, species that are confirmed breeders in annual grass/forb and bunchgrass habitats (see Table 3.6-6), which are most prevalent near the proposed range locations, would be susceptible to these impacts. These species include burrowing owl, grasshopper sparrow, horned lark, killdeer, long-billed curlew, mallard, northern pintail, short-eared owl, and western meadowlark. However, the analysis indicates that military readiness activities are not expected to have a significant adverse effect on a population of a migratory bird species.

Based on this conclusion, the conferencing requirements of the Final Rule authorizing DoD to take migratory birds during military readiness activities do not apply to the Proposed Action. The Navy and ORNG obtained technical assistance from the USFWS for the analysis of potential impacts on migratory birds in accordance with the DoD and USFWS Memorandum of Understanding to Promote the Conservation of Migratory Birds. In addition, implementation of MPs, monitoring, and mitigation measures described above in Section 3.6.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures) and continued implementation of the *NWSTF Boardman INRMP* would promote migratory bird conservation at NWSTF Boardman.

3.6.3.5.3 National Environmental Policy Act Conclusions

Table 3.6-16 lists each stressor analyzed for potential impacts on wildlife resources at NWSTF Boardman. The No Action Alternative would not result in significant impacts on wildlife. Alternative 1 and Alternative 2 may have significant impacts on wildlife, because local declines in the Washington ground squirrel population could occur. Although not required under ESA, the Navy and ORNG (acting as the NGB’s agent) engaged in early conferencing with the USFWS to address impacts on the Washington ground squirrel and develop conservation measures to avoid, minimize, and mitigate impacts on this candidate species.

Table 3.6-16: Summary of the Impacts on Wildlife

Stressors		Summary of Effects and National Environmental Policy Act Determination
Major Stressor Category	**Stressor Type**	
No Action Alternative		
Noise	Aircraft	Short-term minor effects in the form of physiological or behavioral responses. Effects would be widespread.
	Non-explosive Practice Munitions Impact	Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
	Small Arms	Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
	Large Arms	Not applicable. No large arms firing would occur.
	Land Demolitions	Not applicable. No land demolition training would occur.
	Vehicles and Equipment	Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
Physical Strike	Non-explosive Practice Munitions	Minor and localized effects. Low probability of incidental mortality. No observable population effects.
	Aircraft	Minor and localized effects. Low probability of incidental mortality. No observable population effects.
	Vehicles and Equipment	Minor and localized effects. Low probability of incidental mortality. No observable population effects.
Electromagnetic Fields		Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
Lasers		Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
Ground Disturbance and Habitat Alteration	Non-explosive Practice Munitions	Indirect, long-term minor effects in the form of localized habitat degradation.
	Target Maintenance	Indirect, long-term minor effects in the form of localized habitat degradation.
	Construction	Not applicable. No construction would occur.
Impact Conclusion		The No Action Alternative would not result in significant impacts on wildlife.

Table 3.6-16: Summary of the Impacts on Wildlife (continued)

Stressors		Summary of Effects and National Environmental Policy Act Determination
Major Stressor Category	**Stressor Type**	
Alternative 1		
Noise	Aircraft	Short-term minor effects in the form of physiological or behavioral responses. Effects would be widespread.
	Non-explosive Practice Munitions Impact	Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
	Small Arms	Short-term minor effects in the form of physiological or behavioral responses. Effects would be widespread.
	Large Arms	Potential to reduce the fitness of individuals and diminish habitat quality. Potential to cause local population declines in Washington ground squirrels, grasshopper sparrows, western burrowing owls, and long-billed curlews.
	Land Demolitions	Potential to reduce the fitness of individuals and diminish habitat quality. Potential to cause local population declines in Washington ground squirrels, grasshopper sparrows, western burrowing owls, and long-billed curlews.
	Vehicles and Equipment	Short-term minor effects in the form of physiological or behavioral responses. Effects would be widespread.
Physical Strike	Non-explosive Practice Munitions	Minor and localized effects. Low probability of incidental mortality. No observable population effects.
	Aircraft	Minor and localized effects. Low probability of incidental mortality. No observable population effects.
	Vehicles and Equipment	Minor and localized effects. Low probability of incidental mortality. No observable population effects.
Electromagnetic Fields		Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
Lasers		Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
Ground Disturbance and Habitat Alteration	Non-explosive Practice Munitions	Indirect, long-term minor effects in the form of localized habitat degradation.
	Target Maintenance	Indirect, long-term minor effects in the form of localized habitat degradation.
	Construction	Long-term, minor, localized effects in the form of permanent habitat loss and habitat degradation.
Impact Conclusion		Alternative 1 would result in significant impacts on wildlife because local declines in the Washington ground squirrel population could occur. Mitigation measures would be implemented to reduce impacts on this species.

Table 3.6-16: Summary of the Impacts on Wildlife (continued)

Stressors: Major Stressor Category	Stressors: Stressor Type	Summary of Effects and National Environmental Policy Act Determination
Alternative 2		
Noise	Aircraft	Short-term minor effects in the form of physiological or behavioral responses. Effects would be widespread.
	Non-explosive Practice Munitions Impact	Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
	Small Arms	Short-term minor effects in the form of physiological or behavioral responses. Effects would be widespread, but would decrease compared to Alternative 1.
	Large Arms	Not applicable. No large arms firing would occur.
	Land Demolitions	Potential to reduce the fitness of individuals and diminish habitat quality. Potential to cause local population declines in Washington ground squirrels, grasshopper sparrows, western burrowing owls, and long-billed curlews.
	Vehicles and Equipment	Short-term minor effects in the form of physiological or behavioral responses. Effects would be widespread. Decreased compared to Alternative 1 because the DMPTR is not part of Alternative 2.
Physical Strike	Non-explosive Practice Munitions	Minor and localized effects. Low probability of incidental mortality. No observable population effects. Decreased compared to Alternative 1 because the DMPTR is not part of Alternative 2.
	Aircraft	Minor and localized effects. Low probability of incidental mortality. No observable population effects.
	Vehicles and Equipment	Minor and localized effects. Low probability of incidental mortality. No observable population effects. Decreased compared to Alternative 1 because the DMPTR is not part of Alternative 2.
Electromagnetic Fields		Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
Lasers		Short-term minor effects in the form of physiological or behavioral responses. Effects would be localized.
Ground Disturbance and Habitat Alteration	Non-explosive Practice Munitions	Indirect, long-term minor effects in the form of localized habitat degradation. Decreased compared to Alternative 1 because the DMPTR is not part of Alternative 2.
	Target Maintenance	Indirect, long-term minor effects in the form of localized habitat degradation. Decreased compared to Alternative 1 because the DMPTR is not part of Alternative 2.
	Construction	Long-term, minor, localized effects in the form of permanent habitat loss and habitat degradation. Decreased compared to Alternative 1 because the DMPTR is not part of Alternative 2.
Impact Conclusion		Alternative 2 would result in significant impacts on wildlife because local declines in the Washington ground squirrel population could occur. Mitigation measures would be implemented to reduce impacts on this species.

Note: DMPTR = Digital Multipurpose Training Range

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3.7 LAND USE AND RECREATION

3.7.1 INTRODUCTION

3.7.1.1 Definition

For purposes of this analysis, land use is defined as the natural conditions and/or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agriculture, institutional, recreational, and other developed use areas. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas, and are intended to protect specifically designated or environmentally sensitive areas.

3.7.1.2 Plans and Policies

The Naval Weapons Systems Training Facility (NWSTF) Boardman is on federally-owned exclusive jurisdiction land, which is excluded from local and state jurisdictions with regard to land use controls. However, airspace associated with NWSTF Boardman does extend over non-federally owned lands in Morrow, Umatilla, and Gilliam counties. Nevertheless, programs, policies, and local land use plans (each city and county plans its land use by preparing and adopting a state-required *Comprehensive Land Use Plan*) for surrounding areas are discussed within this Environmental Impact Statement (EIS). The United States (U.S.) Department of the Navy (Navy) has developed land use planning documents relevant to the project site, which are also addressed in this EIS.

3.7.1.2.1 City of Boardman Comprehensive Plan

The City of Boardman's original plan (1978) predicted that the City would reach a population of 4,000 over the planning period from 1978 to 1998. As of 2010, the City of Boardman had a population of approximately 3,220 (U.S. Census 2010). Since the last update to the Boardman Comprehensive Plan (2003), the City of Boardman has experienced growth due to a number of employment opportunities in the region (e.g., development of a correctional facility in Umatilla County, employment associated with the Army Depot Incinerator in Morrow and Umatilla counties, and increased development at the Port of Morrow). According to U.S. Census data, the City of Boardman experienced a 105 percent population increase from 1990 to 2000 and a 12.8 percent population increase from 2000 to 2010 (U.S. Census Bureau 2010). Planning for this growth and development has been an important element in land use planning for the City of Boardman.

A *Buildable Lands Inventory* for the City of Boardman was completed in 1997 using a methodology developed by the State of Oregon. The findings generated from the *Buildable Lands Inventory* illustrated that the City of Boardman has adequate land within its current Urban Growth Boundary to accommodate residential and commercial development for the next 20 years based on land supply and population projections.

From 2000 to 2001, Boardman identified areas suitable for development of a "downtown." The study identified a number of alternatives, including areas east and west of the Interstate 84 interchange. Although the alternatives explored and the resulting Plan were not adopted, the City of Boardman developed policies and corresponding code language which addressed the need for the City of Boardman to create an area for future development of a "city center" designated for development of commercial and mixed use (Boardman Comprehensive Plan 2003). This area has not yet been developed. However, the City of Boardman has received a grant from the State of Oregon to further study this development.

3.7.1.2.2 Morrow County Comprehensive Plan

The Comprehensive Plan of Morrow County is carried out by the Morrow County Zoning Ordinance of 1980, amended March 1985, and amended and readopted in November 2001. The Ordinance establishes use zones for lands within Morrow County. The Morrow County Zoning Ordinance also incorporates the Statewide Planning Goals. The Oregon Planning Goals and Guidelines have goals for various types of land uses within the state. For the area surrounding NWSTF Boardman, which is mainly zoned as agricultural lands, Goal 3 of the Oregon Planning Goals and Guidelines is most applicable. Goal 3 focuses on agricultural lands, stating that agricultural lands shall be preserved and maintained for farm use and that urban growth should be separated from agricultural lands by a buffer of open space.

3.7.1.2.3 Umatilla County Comprehensive Plan

The Umatilla County Comprehensive Plan was first acknowledged in October 1985 and has been updated with amendments in June 2010. For the portion of Umatilla County located underneath proposed airspace, which is mainly zoned as agricultural lands, the plan states that Umatilla County will protect lands meeting the definition of farmland, and will assure that non-farm activities will not be encouraged through a specific review system of any developments. The plan also incorporates the Oregon Planning Goals and Guidelines.

3.7.1.2.4 Gilliam County Master Plan

The Gilliam County Comprehensive Plan was first created in 1997 and has been updated with amendments in October 2011. For the portion of Gilliam County located underneath proposed airspace, which is mainly zoned as agricultural lands, the plan states that Gilliam County will preserve and protect agricultural lands, and will assure that non-farm activities will not interfere with agricultural pursuits. The plan also incorporates the Oregon Planning Goals and Guidelines.

3.7.1.3 Determination of Significance

The impact analysis for land use considered possible changes to ownership, usage, management, or recreational usage that could result from the Proposed Action. Such changes could arise from land or air training activities whose influence could extend beyond the boundaries of NWSTF Boardman. Factors used in determining whether impacts to land use would be significant relate to the extent that proposed training or testing would alter or disrupt area land use such that there is a loss of usability or compatibility, routine activities would no longer be feasible, or would modify either the historical or designated land use. Additionally, areas where the noise analysis (see Section 3.4, Noise) indicates that, pursuant to the National Environmental Policy Act, a significant noise impact will occur over noise sensitive areas within the Day-Night Sound Level (DNL) 65 decibel (dB) contour, the analysis in Section 3.4 (Noise) includes a discussion of the noise impact on those areas. As such, noise (as related to area land use) is analyzed for each alternative below. Any mitigation measures to be taken in addition to those associated with other land use controls are also discussed.

3.7.2 AFFECTED ENVIRONMENT

3.7.2.1 Regional Setting

NWSTF Boardman is located 2 miles (mi.) (3.2 kilometers [km]) south of the City of Boardman, Oregon. The City of Boardman is located in northern Morrow County, adjacent to the Columbia River. Boardman lies 162 mi. (260.7 km) by road east of Portland, Oregon along Interstate 84, and 31 mi. (49.9 km) by road west of Hermiston, Oregon along Interstate 84 and Highway 207. The City has a population estimate of 3,220, with a full-time administrative staff, and is governed by a Mayor and six-member City Council elected by the citizens (U.S. Census Bureau 2010).

3.7.2.2 Region of Influence

The Region of Influence for land use and recreation includes areas inside the boundaries of NWSTF Boardman, the neighboring areas of the City of Boardman, surrounding areas of Morrow County, and portions of Umatilla and Gilliam Counties under the restricted airspace and the Military Operations Area (MOA) airspace.

3.7.2.3 Existing Land Use at NWSTF Boardman

On January 23, 1941, the President issued Executive Order (EO) 8651, whereby the area now encompassing NWSTF Boardman was withdrawn from public lands to be used for aerial bombing and gunnery ranges by the War Department. Military use of NWSTF Boardman began in 1943 when the U.S. Army Air Corps, and subsequently the U.S. Air Force, used the site (approximately 96,000 acres (ac.) [38,849.8 hectares {ha}]) for aerial bombing and gunnery training until 1958 when the Navy was given permission under a permit arrangement to use the property for aerial bombing practice. The property was formally transferred from the Air Force to the Navy in November 1960. In 1963, the Navy transferred by deed the western half of the property, approximately 48,568 ac. (19,654.8 ha), to the state of Oregon and retained approximately 47,432 ac. (19,195.1 ha) within its exclusive jurisdiction. The land component of NWSTF Boardman is federally withdrawn land with title held by the United States but management functions held by U.S. Navy, Commander, Navy Region Northwest, which have been delegated to Commanding Officer Naval Air Station (NAS) Whidbey Island. As such, the Commanding Officer, NAS Whidbey Island is solely responsible for land and natural resource management on NWSTF Boardman property.

NWSTF Boardman consists of 47,432 ac. (19,195.1 ha) of relatively flat, vegetated landscape. The land area is predominantly rectangular in shape and is approximately 12 mi. by 6 mi. (19.3 km by 9.6 km) (Figure 1-1). Several air-to-ground targets currently exist within the boundaries of NWSTF Boardman and have been in place for a long time, although their scoring systems have been removed. There are several structures (administrative building, etc.) that currently exist to support training activities as well as an unimproved Unmanned Aircraft Systems airstrip used by the Oregon National Guard (ORNG) (Figure 21). Additionally, on the eastern boundary of the facility along Bombing Range Road outside of the range fence line, there is an easement for a road and utility corridor.

The Nature Conservancy has a cooperative management agreement for approximately 5,050 ac. (2,043 ha) of NWSTF Boardman, divided among three tracts, which are managed as Research Natural Areas (RNAs). The RNAs are focused primarily on the conservation of relic populations of native grasslands and are used for ecological studies. At the time the cooperative management agreement for the RNAs was created with The Nature Conservancy, little was known about what areas of NWSTF Boardman were the healthiest and most ecologically important. RNA “A” is centered on the main target bull’s-eye, located in the center of NWSTF Boardman. This RNA has received a considerable amount of disturbance over the years from the use of the target for bombing practice, and current Navy range access rules prevent the Nature Conservancy from entering RNA A.

Almost all of NWSTF Boardman was previously outleased as grazing lease areas until 2001 and three half crop circles were outleased for agriculture on the north central boundary of the installation until 2002. Both sheep and cattle historically grazed on the range and alfalfa was grown in the crop circles. Since NWSTF Boardman is an active munitions training range, all agricultural outleases must comply with the requirements of Department of Defense (DoD) Publication 6055.09-STD (2008) and Naval Sea Systems Command Publication OP-5 (2009). Both publications limit access to active training ranges to necessary operational functions and set requirements for leasing ranges with potential unexploded ordnance. The requirements and reviews are extensive and the cost of meeting those requirements, when weighed against the potential income and benefit generated from an agricultural outlease program, would be very cost prohibitive. Because of those issues as well as additional safety concerns, no agricultural grazing outlease program is operating at present or anticipated to operate on the range in the future. Aircraft from NAS Whidbey Island in Washington and the ORNG regularly used NWSTF Boardman for aerial bombing until 1996. Navy and ORNG aircraft used, and continue to use, a portion of the facility for aerial gunnery practice. As presented in detail in Chapter 2 (Description of Proposed Action and Alternatives), NWSTF Boardman is currently used for the following training and testing activities, the land components of which are mainly performed within the main target area.

- Air Warfare Training – Low-Altitude Tactical Training (LATT), Surface to Air Counter Tactics, and Air Combat Maneuvers
- Electronic Combat Training – Electronic Attack and Electronic Support
- Strike Warfare – Air-to-Ground Bombing Exercises, Air-to-Ground Gunnery Exercises, and Air-to-Ground Missile Exercises (captive-carry events only)
- Unmanned Aircraft Systems Operations
- Insertion and Extraction
- Helicopter Training Operations (Low Level Training Flights, Hoisting Operations, Sling Load Operations, and Austere Landings and Take-Offs)
- Live Fire Range Operations (marksmanship and small arms training) and Dismounted Maneuver Training (Maneuver to Contact Live Fire Training)
- Intelligence, Surveillance, and Reconnaissance

3.7.2.4 Existing Airspace over NWSTF Boardman

The airspace over NWSTF Boardman is comprised of two different types of special use airspace (SUA): Restricted Areas (R-5701 [A-E] and R-5706) (Figure 1-3) that overlay most of the NWSTF Boardman, and the MOA airspace. The current Restricted Area (R-5701) at NWSTF Boardman starts at the surface, and R-5706 starts at 3,500 feet (ft.) (1,066.8 meters [m]) and extends over the City of Boardman. The Boardman MOA overlies most of the Restricted Areas. Designated by the Federal Aviation Administration (FAA), Restricted Areas are SUA within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Activities taking place in the airspace must be confined due to their nature and the need to adhere to limitations imposed on aircraft operations for which the SUA is designated (FAA Order 7400.8). Restricted Areas denote the existence of unusual, often dangerous, hazards to aircraft such as weapons firing, aerial gunnery, or Unmanned Aircraft System (UAS) operations. Table 1-1 in Chapter 1 (Purpose and Need for the Proposed Action) of this EIS provides additional information on NWSTF Boardman's Restricted Areas, which are the only restricted airspace in the state of Oregon.

MOAs are SUA of defined vertical and lateral dimensions. These delineations define vertical and lateral limits that have been established by the FAA to segregate air activities, which may be hazardous to non-participating aircraft. Boardman currently has only one MOA and it provides military aircraft maneuver space for training. The MOA contains within its boundaries Restricted Areas R-5701 and R-5706.

Restricted Area (R-5701) was originally established on December 1, 1949 (effective date), as the Boardman, Oregon, Danger Area (D-251), listing the "92d Bombardment Wing, Spokane Air Force Base

(AFB), Spokane, Wash." as the using agency. On December 9, 1954, the Boardman, Oregon, Danger Area (D-251) became the Boardman, Oregon, Restricted Area (R-251) when the Civil Aeronautics Administration changed the terminology of "danger areas" to "restricted areas." On March 9, 1961, the Boardman, Oregon, R-251 became R-5701 Boardman, Oregon, when the FAA revised its regulatory guidance and amended the restricted area descriptions at the time by (1) deleting chart references and (2) renumbering the individual restricted areas to correspond to the numbers assigned to their respective states. There was no change to the restricted airspace other than a new title. On June 14, 1961, R-5701 Boardman, Oregon, was amended to change the designated altitudes from "surface to 50,000 ft. (15,240 m) mean sea level" to "Surface to Flight level 450" and change the using agency from the "92d Bombardment Wing, Fairchild AFB, Wash." to "Commanding Officer, NAS Whidbey Island, Wash (Washington)."

In the early 1960s, and again in 1969, consideration was made by the Navy and the State of Oregon to relocate the range to some other suitable site. The effort ended in 1963 after the State decided not to provide funding for the Navy to verify the suitability of a potential site in southeast Oregon. The net results of the efforts were a series of agreements in 1963 whereby the Navy reduced their land holdings, and retained avigation easements for low-level flight over the corridors east, west, and southwest of the range (Figure 3.7-1). An avigation easement is a property right acquired from a land owner for the use of airspace above a specified height, which is 100 ft. (30.5 m) for improvements and 35 ft. (10.7 m) for overhead lines at NWSTF Boardman. Avigation easements may grant the right-of-flight including the right to noise and dust inherent in aircraft flight; the right to restrict or prohibit lights, electromagnetic signals, and bird-attractants; the right to unobstructed airspace, and the right of entry upon the land to exercise those rights. An additional avigation easement was created in 2012, which acquired property rights from Boardman Tree Farm, LLC for the use of airspace between 125 ft. (38.1 m) and 500 ft. (152.4 m) immediately north of the existing eastern avigation easement and along the border of NWSTF Boardman. The current regulations on the restricted airspaces include operational times from 0730 to 2359 Monday through Friday and at other times by notices to airmen (NOTAMs) six hours in advance (FAA Order 7400.8).

3.7.2.5 Surrounding Land Use

3.7.2.5.1 City of Boardman

NWSTF Boardman is located south of the City of Boardman city limits in Morrow County. To the west of the City of Boardman, along the Columbia River, is the Boardman Airport. The airport is located approximately 5 mi. (8 km) from downtown Boardman and approximately 1 mi. (1.6 km) from NWSTF Boardman. Interstate 84 runs east-west through the town, dividing the city roughly one-third to the north and two-thirds south. Within the city limits, zoning is a combination of residential, industrial, commercial, open space, and easements as designated by the City of Boardman (Boardman Comprehensive Plan 2003).

Historically, most of the City's development has occurred on the north side of the Interstate 84/Main Street interchange. However, in past years, the residential land on the north side has been building out and more residential development has been occurring on the south side. The north and south sides of the City of Boardman are served by two interchanges: Laurel Lane at the west end of town, which serves most of the commercial and residential development, and Main Street at the east end of town which primarily serves the Port of Morrow and the industrial area.

Within the City of Boardman are municipal parks and administrative offices. Community support facilities in the City of Boardman include a library, churches, educational facilities, a police station, a fire station, and a health clinic. Schools and community support facilities located within the City of Boardman are shown on Figure 3.7-2. The Windy River and Sam Boardman Elementary schools are the closest to NWSTF Boardman and are approximately 1.5 mi. (2.41 km) from the northern boundary. Riverside Junior and Senior High School is located north of Interstate 84 along with the Blue Mountain Community College.

3.7.2.5.2 Morrow County

Morrow County extends east and west from the city limits of Boardman and south of NWSTF Boardman. The zoning established by Morrow County immediately surrounding NWSTF Boardman on all sides is Exclusive Farm Use. According to Morrow County zoning, Exclusive Farm Use zones are created to “preserve and maintain agricultural lands for farm use consistent with historical, existing, and future needs, including economic needs that pertain to the production of agricultural products, and to permit the establishment of only those uses that are compatible with agricultural activities” (Morrow County 2001). Exclusive Farm Use allows limited residential uses that are provided in conjunction with farm use (Morrow County 2001). Extending north from the facility, land use includes small farms (Figure 3.7-2).

Private farmland located west of NWSTF Boardman, Threemile Canyon Farms, agreed to designate 22,600 ac. (9,146 ha), as a Farm Conservation Area for management by the Nature Conservancy, as habitat for the Washington ground squirrel, birds, and plants. An additional 10,000 ac. (4,046.8 ha) of dry land may be developed as a wind power site (Windpower 2011). The farm's remaining lands accommodate the Portland General Electric Company’s coal-fired electric plant (which is aiming to be coal free by 2020), Boeing's aviation testing facility, and beef feedlots. On the far western boundary of Morrow County within the NWSTF Boardman restricted area, there are several proposed sites for wind turbine construction (Figure 3.7-3). To the east of NWSTF Boardman there is mainly agricultural land, including a tree farm. There are some existing wind turbines to the far eastern border of the restricted area and there are several sites proposed for wind turbine construction closer to the eastern border of NWSTF Boardman (Figure 3.7-3).

To the east of the City of Boardman on the Columbia riverfront is the Port of Morrow, Oregon’s second largest port. The Port of Morrow, one of the nation's largest inland ports, has a significant amount of industrial land along the Columbia River in Boardman, and uses the Columbia River, rail lines, and the Interstate for Boardman’s shipping (Boardman Comprehensive Plan 2003). The port property includes two Portland General Electric Company gas-fired power plants.

3.7.2.5.3 Umatilla County

Umatilla County is located to the east of Morrow County. Extending east from the Morrow County line, the land use in Umatilla County includes small farms (Figure 3.7-2). The only activities proposed to occur within Umatilla County are aircraft overflights within the eastern portion of the restricted airspace and the MOA over the northwestern portion of the county. These activities are proposed to occur over lands zoned currently as Federal Land (the Umatilla Chemical Depot [UCD]) and as Exclusive Farm Use.

3.7.2.5.4 Gilliam County

Gilliam County is located to the west of Morrow County. Extending west from the Morrow County line, the land use in Gilliam County includes small farms and wind turbine operations (see Figure 3.7-3). The only activities proposed to occur within Gilliam County are the western portion of the existing restricted airspace areas.

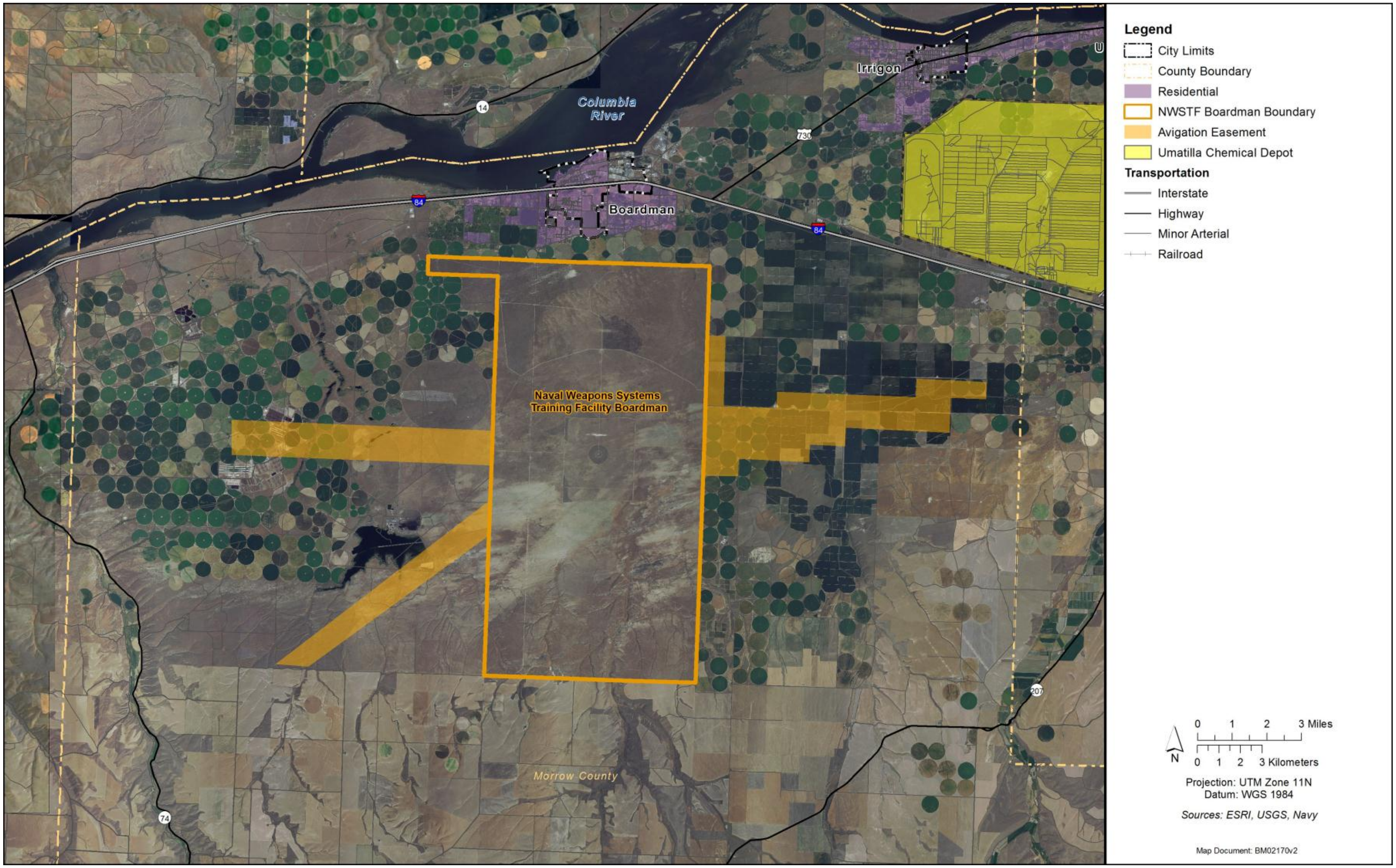

Figure 3.7-1: Avigation Easements at NWSTF Boardman

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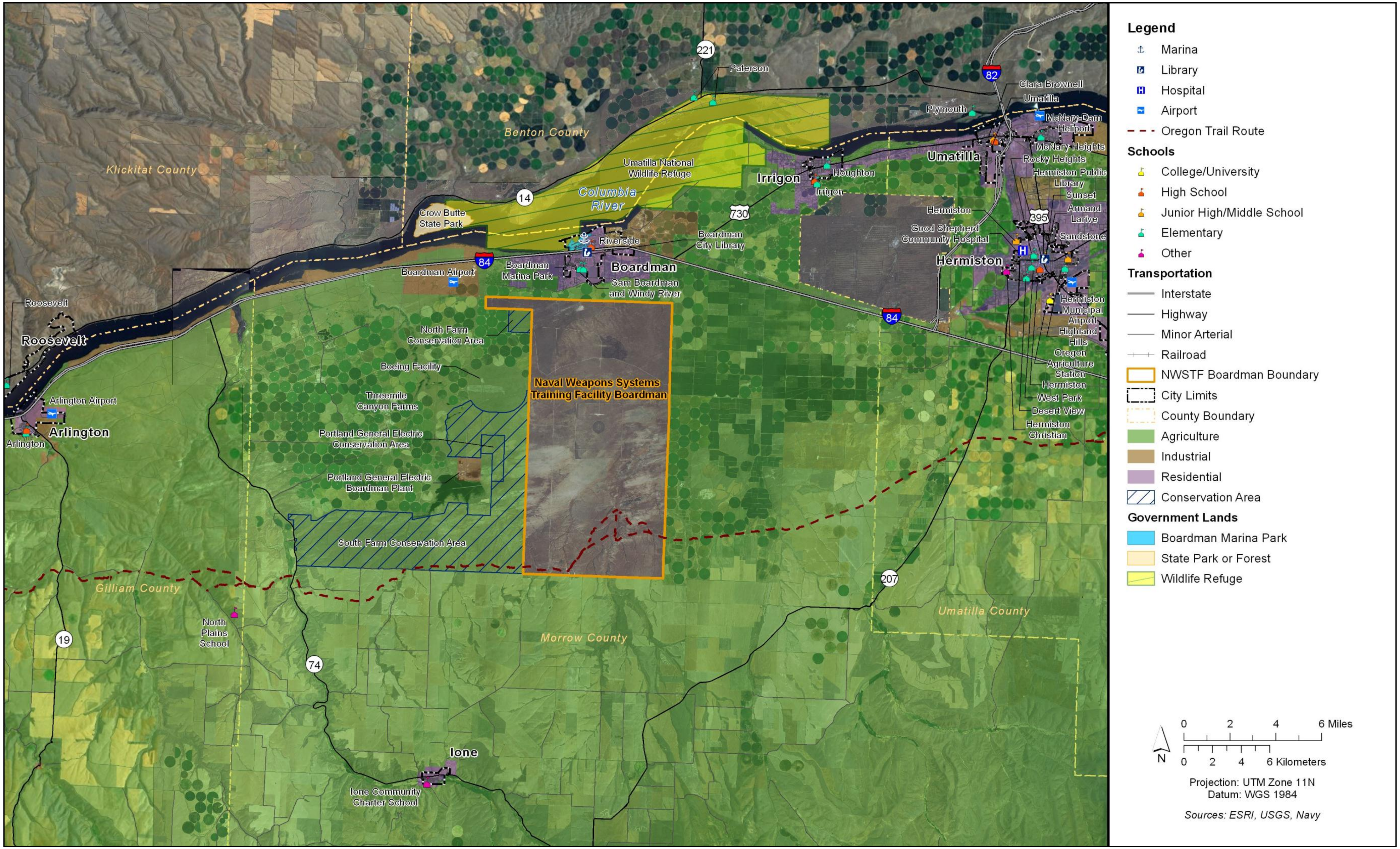

Figure 3.7-2: Boardman Land Use

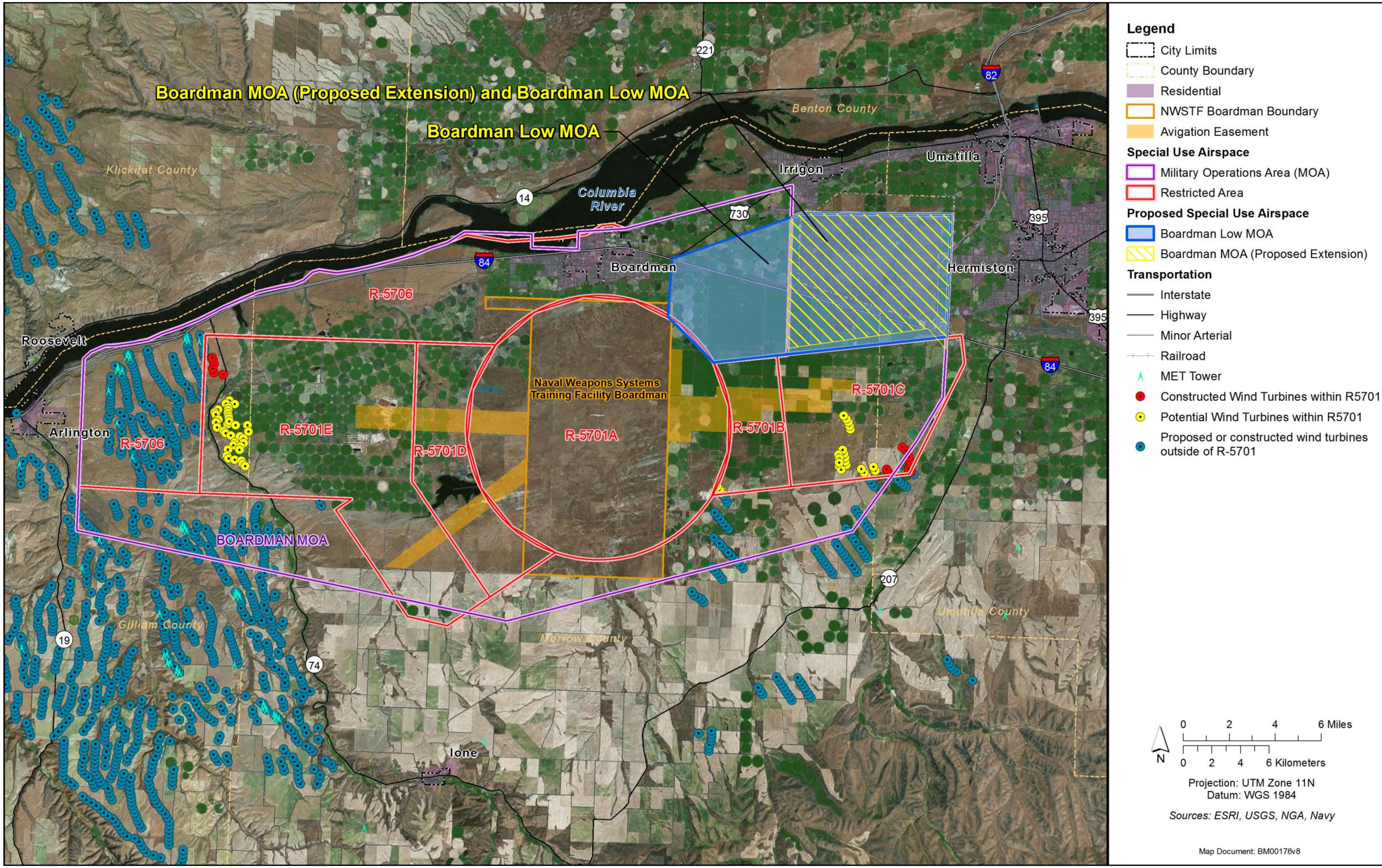

Figure 3.7-3: Existing and Potential Wind Turbine Locations

3.7.2.5.5 Compatible Land Use

Large tracts of agricultural property are found to the north, east, and south of the installation. Since there are large tracts of agricultural or preserve lands surrounding the installation, there have historically been minimal non-Navy interests to interact with any Navy operations occurring at the installation. Land use surrounding NWSTF Boardman has generally been compatible with the military use of the facility and the airspace overhead. Evolving use of agriculture lands to support wind development has caused incompatible land use to occur, making it difficult to safely conduct military flight training activities within the restricted airspace. The Navy understands the needs of the region to promote economic development and therefore is attempting every means possible to mitigate incompatibility, given the importance of maintaining full military training use of the airspace, as well as not stymieing economic development. Renewable energy development in the area has been supported by robust tax incentives both to businesses and private entities. Local, state and federal review processes have been challenging to track, causing the Navy to be hampered by non-notification of actions and flawed administrative processes that have failed to allow for precautions in siting projects within restricted areas. However, the Navy has been and will continue to work through community outreach with local officials to engage local developers early and often. A Range Installation Compatible Use Zone Study (RAICUZ) will follow a decision on this EIS. The RAICUZ will evaluate further solutions to land compatibility and noise in order to allow the local county planners to consider additional measures that support both the airspace use, public safety and development.

3.7.2.6 Recreational Interests

Recreational facilities are defined as those amenities that provide for rest, activity, education, or other opportunities for leisure services and community support that lead to an enhanced quality of life. These include nature preserves, parks, parkways, beaches, playgrounds, and community gardens. Outdoor recreation involves programs, activities, or opportunities dependent upon the natural environment. Examples include fishing, picnicking, bird-watching, hiking and interpretive trails, and camping areas. Many outdoor recreational opportunities are available in the NWSTF Boardman Region of Influence. A description of various parks and recreational facilities near NWSTF Boardman is presented in Table 3.7-1, and Section 3.10 (Cultural Resources) presents information on the Oregon Trail.

3.7.2.7 Current Requirements and Management Practices

3.7.2.7.1 Access Restrictions

Persons authorized to access NWSTF Boardman lands are authorized military personnel and civilian employees of DoD, or authorized contractors and personnel from research organizations. Recreational use of NWSTF Boardman is not authorized at this time due to the nature of the facility being used as an active training range. Public access to NWSTF Boardman is controlled per NASWHIDBEYINST 8020.8 Ground Entry/Access to NWSTF Boardman. The control of public access is for security reasons, and to safeguard against potential hazards associated with military activities, and is accomplished through the use of fences and posted signs at NWSTF Boardman. However, the Well Springs site, Pioneer Cemetery, and a portion of the Oregon Trail on the southern range boundary are open to the public (approximately 200 ac. [81 ha]).

The airspace over NWSTF Boardman is comprised of two different types of SUA: Restricted Areas (R-5701 [A-E] and R-5706) that overlay portions of the NWSTF Boardman land areas and a MOA (Boardman MOA, OR) that overlies most of the Restricted Areas. Designated by the FAA, Restricted Areas are SUA within which the flight of non-participating aircraft, while not wholly prohibited, is subject to restrictions. Activities taking place in the airspace must be confined due to their nature and the need to adhere to limitations imposed on aircraft activities for which the SUA is designated (FAA JO 7400.8). Non-participating military and civilian aircraft are not allowed into the Restricted Areas without the controlling authority's approval.

According to the 14 Code of Federal Regulations (C.F.R.) §1.1, a MOA is airspace established outside Class A airspace (18,000 to 60,000 ft. [5,486.4 to 18,288 m] Mean Sea Level [MSL]) to separate or segregate nonhazardous military activities from Instrument Flight Rules traffic (IFR) and to identify for Visual Flight Rule (VFR) traffic where these activities are conducted. The designation of a MOA identifies for other users the areas where military activity occurs, provides for segregation of IFR traffic, and allows charting to keep airspace users informed. MOAs do not restrict VFR operations, however, pilots operating under VFR should exercise extreme caution while flying within, near, or below an active MOA. The Boardman SUA currently has only one MOA and it provides military aircraft maneuver space for training (Figure 1-3).

Table 3.7-1: Boardman Recreational Areas

Recreational Areas	Description
Columbia River	The Columbia River is widely used for a variety of commercial (shipping) and recreational activities (boating, tourism, and fishing). There are several public and private marinas headquartered east and west of Boardman.
Boardman Marina and RV Park	The Boardman Marina and RV Park, located on the Columbia River, has 63 full hookup sites, tent camping sites, dock space for boats and a boat launch ramp. It is operated by the Boardman Park and Recreation District. In addition to camping and the adjacent marina, the park offers a large day-use area with shelters and nearby tennis courts.
Crow Butte Park	Crow Butte Park is a 275 ac. (111.3 ha) park located on an island in the Columbia River. The park is accessible by motor and river traffic. It is operated by the Port of Benton and supports camping activities, day use, and boating.
Umatilla National Wildlife Refuge	Established in 1969 as mitigation for habitat lost through flooding caused by the construction of the John Day Dam on the Columbia River, Umatilla National Wildlife Refuge is a mecca for birdwatchers and wildlife enthusiasts. The refuge is a varied mix of open water, sloughs, shallow marsh, seasonal wetlands, cropland, islands, and shrub-steppe upland habitats. It is divided into six units—two in Oregon, three in Washington, and one in the middle of the Columbia River.
Oregon Trail	The Oregon Trail is a 2,000 mi. (3,200 km) historic east-west wagon route that connected the Missouri River to valleys in Oregon and locations in between. The Trail crosses the southern boundary of NWSTF Boardman Range. The area attracts visitors onto the southern range boundary. The historic Well Springs site and Pioneer Cemetery are located on the southern boundary and is opened to the public within fenced Navy property.

Notes: NWSTF = Naval Weapons Systems Training Facility, mi. = miles, km = kilometers, ac. = acres, ha = hectares
With regards to FAA Impact Categories, Compatible Land Use and Historical, Architectural, Archeological, and Cultural Resources: Designation of airspace for military flight operations is exempt from section 4(f). The National Defense Authorization Act for Fiscal Year 1998 (Public Law 105-85) provided that "[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of section 303(c) of Title 49, United States Code."

Whenever the MOA is being used, or is activated, nonparticipating IFR traffic may be cleared through the MOA if IFR separation can be provided by Seattle Air Route Traffic Control Center (ARTCC). Otherwise, Seattle ARTCC will reroute or restrict nonparticipating IFR traffic. At the cessation of military use of the MOA, the airspace is deactivated and nonparticipating IFR traffic is no longer restricted in the area.

According to FAA and DoD policy, SUA should be made available for use by nonparticipating aircraft when all or part of the airspace is not needed by the using agency. To accommodate the joint use of SUA, a Letter of Agreement or a Letter of Procedure is drafted between the controlling agency and the using agency. In the case of R-5701 [A-E] and R-5706 above NWSTF Boardman, a Letter of Agreement is in place between Seattle ARTCC and NAS Whidbey Island. Any new MOA, upon designation by the FAA, would be addressed through an update to the existing or a new letter of agreement. Through the Letter of Agreement, the Navy establishes the activation/deactivation procedures for the SUA and may outline periods when the FAA, with the Navy's concurrence, may route IFR traffic through the active SUA (NASWHIDBEY INSTRUCTION 3770.1, FAA JO 7400.8).

The avigation easements established to the east, west, and southwest of NWSTF Boardman grant the right-of-flight including the right to noise and dust inherent in aircraft flight; the right to restrict or prohibit lights, electromagnetic signals, and bird-attractants; the right to unobstructed airspace; and the right of entry upon the land to exercise those rights. Additionally, each of these avigation easements allows improvements so long as they are less than 100 ft. (30.5 m) in height, do not interfere with line of vision of pilots, and there are no overhead lines that exceed 35 ft. (10.7 m) in height.

3.7.2.7.2 Fire Management

Commander, Navy Region Northwest (CNRNW) has implemented a regional Fire Management Plan. The Navy is currently revising, updating and expanding the specific portion of that plan applicable to NWSTF Boardman. The current fire strategy is to use the existing road system as the staging lines at which fires will be fought. The Navy currently maintains a system of 60 ft.-wide fire breaks throughout NWSTF Boardman. A detachment of six Navy personnel are stationed at NWSTF Boardman. Their responsibilities are to maintain the buildings, roads, wells, fences, and other infrastructure and provide security in accordance with NASWHIDBEY INSTRUCTION 3120.6 (NWSTF Boardman Standard Operating Procedures).

The Navy previously had a mutual aid agreement for wildland fire response with UCD fire department. However, the Depot completed its mission in late 2011 and was closed down through the Base Realignment and Closure process. The fire department responsibilities have been transferred to the Oregon Military Department, and a Mutual Aid Agreement was drafted and signed in 2013 and is effective through 2018. For more information on fire management at NWSTF Boardman, refer to Section 3.12 (Public Health and Safety and Protection of Children).

3.7.3 Environmental Consequences

This resource section focuses on groups of training activities that have the potential to result in an impact on land use. Similar types of activities are grouped together in the discussion to facilitate the impacts analysis. Types of activities that could affect land use include both air and land activities, and these activities identified in Chapter 2 (Description of Proposed Action and Alternatives) have been analyzed in this section.

3.7.3.1 No Action Alternative

3.7.3.1.1 Air Activities

Under the No Action Alternative, aircraft activities would continue to result in overflights of public and private land adjacent to NWSTF Boardman (Figure 2-2). Aircraft are required to approach and depart from the designated flight paths that avoid populated areas. The FAA has established Restricted Areas for military operations, in this case, R-5701 [A-E] and R-5706. When military aircraft are conducting operations that are hazardous to non-participating aircraft, the military aircraft are confined to SUA, which is specifically designed for this purpose and restricts use by non-participating aircraft. Limitations outside of normal operating hours are communicated to commercial airlines and general aviation by Notices to Airmen, published by the FAA and by direct communications with the controlling agency Seattle ARTTC. Aircraft overflights associated with the No Action Alternative would not directly change the ownership, land use, management, recreation or visual setting of the area beneath it. According to the Comprehensive Plans (Section 3.7.1.2) for the counties under the airspace associated with the No Action Alternative, there are no projected changes in land use that would be impacted by the current airspaces. Aircraft activities occur over communities already subjected to these types of activities. Sound associated with aircraft activities, as well as compatibility of sound levels with existing land use and sensitive noise receptors, is addressed in Section 3.4 (Noise).

3.7.3.1.2 Land Activities

Land training activities are conducted within areas currently designated for military training use. Since these activities are consistent with established land uses within NWSTF Boardman, there would be no impact on current land use within the installation.

3.7.3.2 Alternative 1

Alternative 1 would include all current training and testing activities described under the No Action Alternative, an increase in existing training activities, new training activities, range enhancements to meet Navy and ORNG training requirements, and the establishment and use of an additional MOA to the northeast of the existing airspace. The following proposed range enhancements would support new training activities and some ongoing activities:

- Establishment and use of an additional MOA to the northeast of the existing airspace;
- Construction and operation of a Multipurpose Machine Gun Range, a Digital Multipurpose Training Range (DMPTR), and associated support facilities;
- Construction and operation of an eastern Convoy Live Fire Range (CLFR), a Demolition Training Range, and a Unmanned Aircraft Systems Training and Maintenance Facility with small airstrip;
- Designation and establishment of a Drop Zone to accommodate parachute operations of personnel and small- to medium-sized equipment (Containerized Delivery Systems).

3.7.3.2.1 Air Activities

Under Alternative 1, air training activities would continue to traverse public and private lands in existing NWSTF Boardman airspace. The number of fixed-wing and rotary-wing (non-UAS) sorties would increase from 847 to 1,627 under Alternative 1. The frequency of overflights would generally increase by up to 190 percent over existing conditions. While the total number of sorties would increase, typical flight paths for LATT would change their orientation as a result of the addition of Special Use Airspace (Boardman Low MOA and Boardman MOA [Proposed Extension]) (Figure 3.7-4). The establishment of the proposed MOA would (1) accommodate proposed increases in LATT; (2) lower the lower altitude of

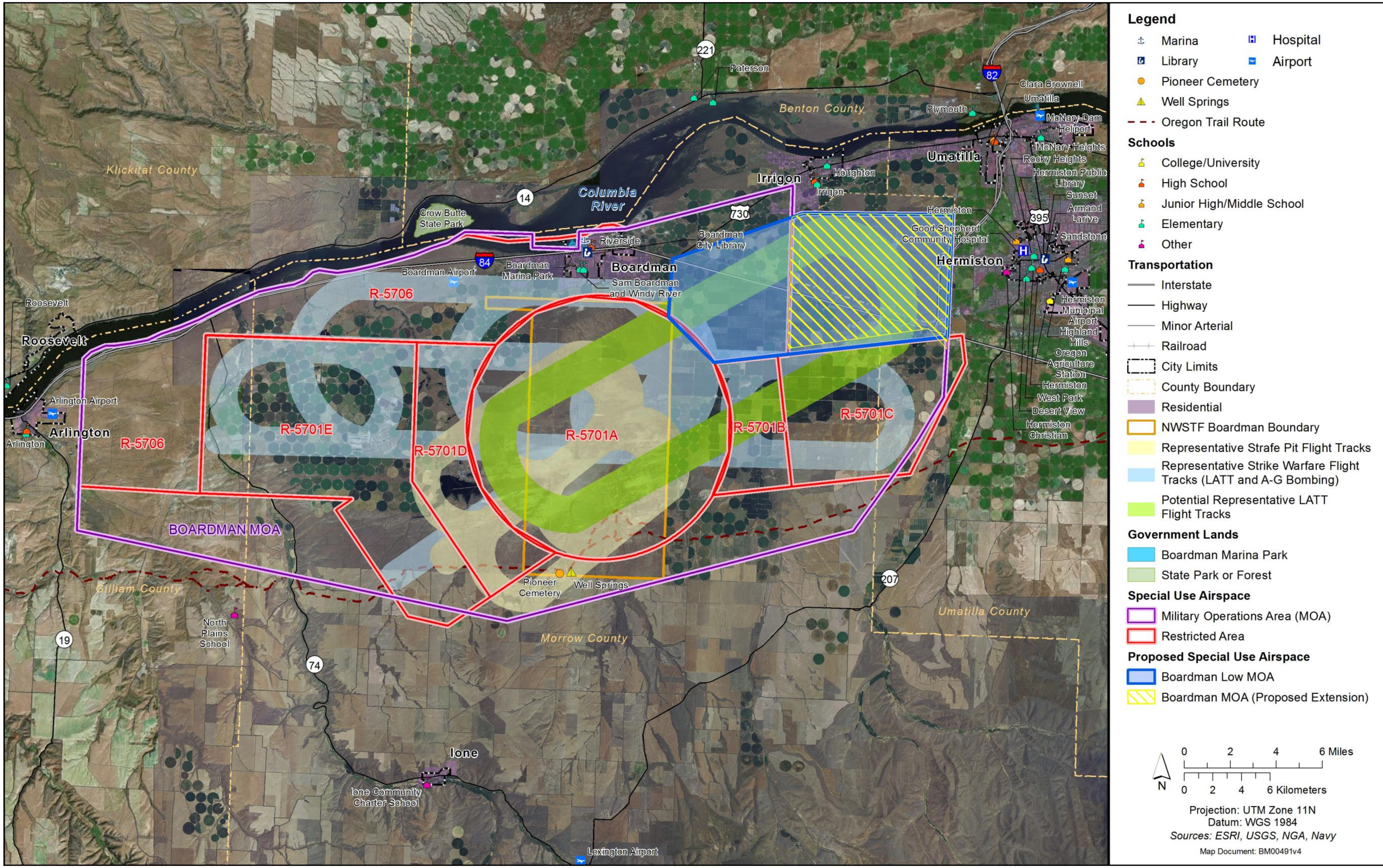

Figure 3.7-4: Aircraft Flight Tracks under Alternative 1 and 2 (Representative)

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the available airspace (the lower altitude of the current Boardman MOA is 4,000 ft. [1,219.2 m] mean sea level, the Boardman Low MOA would lower this limit to 500 ft. [152.4 m] above ground level [AGL]); (3) create a new MOA where the current National Security Area (NSA) was located (and is already avoided by aviators); and (4) adjust LATT flight patterns to decrease conflict with wind turbines in R-5701C.

Individuals underneath the flight paths of these activities would be exposed to aircraft noise. Flights over public and private lands would continue to be of short duration (with flights lasting 5–10 seconds at any point along the aircraft's flight path). Air operations would continue to be conducted in accordance with regulations for the use of aircraft targets, Restricted Areas, and MOAs/Air Traffic Control Assigned Airspace scheduled by NAS Whidbey Island (NASWHIDBEY INSTRUCTION 3770.1). Additional lands underneath the new northeast MOA would experience aircraft overflights though these events are not expected to influence ownership or management of the lands below the newly established MOA. Though the lower limit of the airspace is 500 ft. (152.4 m) AGL, the typical flight path of aircraft that would operate in the northeast MOA is climbing from low-altitude training over NWSTF Boardman to higher elevations (while within the northeast MOA) in order to turn back towards the center of NWSTF Boardman. Additionally, at these higher elevations, no changes to recreational or visual settings are expected.

The FAA has established Restricted Areas for military operations, in this case, R-5701 [A-E] and R-5706. When military aircraft are conducting operations that are not compatible with non-participating aircraft activities, the military aircraft are confined to the designated SUA, which is specifically designed for this purpose. Limitations outside of normal operating hours are communicated to commercial airlines and general aviation by Notices to Airmen, published by the FAA. With the increase in sorties under Alternative 1, there would be an associated increase in the number of activations/deactivations of the NWSTF Boardman Restricted Areas, limiting the availability of the airspace to non-participating aircraft. Airspace would continue to be made available for nonparticipating aircraft outside of training activity periods. New aircraft overflights in existing SUA associated with Alternative 1 would not directly change the ownership, land use, management, recreation, or visual setting of the area beneath it. According to the Comprehensive Plans (Section 3.7.1.2) for the counties under the airspace associated with Alternative 1, there are no projected changes in land use that would be impacted by the current or proposed airspaces. Aircraft activities would continue to occur over communities already subjected to these types of activities.

According to FAA and DoD policy, SUA should be made available for use by nonparticipating aircraft when all or part of the airspace is not needed by the using agency. To accommodate the joint use of SUA, a Letter of Agreement or a Letter of Procedure is signed between the controlling agency and the using agency. In the case of R-5701 [A-E] and R-5706 within NWSTF Boardman, a Letter of Agreement is in place between Seattle ARTCC and NAS Whidbey Island. Through the Letter of Agreement, the Navy and FAA establish the activation/deactivation procedures for the SUA (NASWHIDBEY INSTRUCTION 3770.1). Additionally, a Letter of Agreement would be put in place for the establishment of the northeastern MOA upon designation by the FAA.

Under Alternative 1, there would be a moderate decrease in available airspace time for nonparticipating aircraft as well as a decrease in the availability in the available airspace time for nonparticipating aircraft in Restricted Areas SUA. However, use of the restricted area SUA by nonparticipating aircraft would be allowed given proper scheduling and prior notifications.

The northeast MOA would not limit use by non-participating aircraft, although aircraft entering this area would need to maintain vigilance, especially from two hours after sunrise until two hours before sunset, which is when LATT activities could occur in the MOA. Although there is an expected decrease in availability of airspace to non-participating aircraft flying under instrument flight rules and increase in the vigilance needs of those aircraft flying under visual flight rules, this is not expected to alter or disrupt existing area land use to the extent that routine activities would no longer be feasible, or that the historical or designated land use would be modified.

Portions of the northeast MOA overlie the UCD, which is located in both Umatilla and Morrow Counties in eastern Oregon, approximately 170 mi. (273.6 km) east of Portland, Oregon. On November 14, 2008 the Department of the Army issued a surplus determination indicating that 17,055 ac. (6,901.9 ha) of fee simple property and 2,674 ac. (1,082.1 ha) of easements, for a total of 19,729 ac. (7,984.04 ha) of property, would be available for redevelopment. The Office of Economic Adjustment recognized the Umatilla Army Depot Reuse Authority as the planning Local Redevelopment Authority (LRA) in January 2009. The LRA is comprised of representatives from the Port of Morrow, the Port of Umatilla, Umatilla and Morrow Counties, the Confederate Tribes of the Umatilla Indian Reservation, and two ex-officio State representatives.

The LRA's Redevelopment Plan and Homeless Assistance Submission was approved by the U.S. Department of Housing and Urban Development in October 2010. Two homeless services providers will receive personal property and lease some storage space as part of the approved plan. The approved Redevelopment Plan calls for the following land uses: Agriculture (655 ac. [265.1 ha]), Wildlife Refuge (5,613 ac. [2,271.5 ha]), Military Training (7,421 ac. [3,003.2 ha]), Highway Commercial Industrial (1,077 ac. [435.8 ha]), Interstate Corridor (91 ac. [36.8 ha]), Industrial Restricted (942 ac. [381.2 ha]), and Industrial Unrestricted (1,115 ac. [451.2 ha]) (Figure 3.7-5).

The placement of the northeast MOA is not anticipated to impact redevelopment of the Umatilla Chemical Depot. However, with the lower limit of the proposed SUA being 500 ft. (152.4 m) AGL, the range of land uses below this MOA could be limited in the future in order to be compatible for safety purposes. According to 14 C.F.R. §91.119 (minimum safe altitudes) under FAA Guidelines, if a land use creates a "congested area" over a city, town, or settlement, or over any open air assembly of persons, then the minimum altitude of an aircraft would be restricted to 1,000 ft. (304.8 m) AGL. Therefore, with the proposed northeast MOA, any future land uses that could create a "congested area" would be restricted from development.

As listed in Section 3.4 (Noise), portions of lands to the west of NWSTF Boardman (conservation lands and agricultural lands) and east (agricultural lands) have a community DNL between 60 and 70 decibels, A-weighted (dBA) as a result of military training activities. Community sound levels up to 65 dBA are compatible with land uses such as residences, transient lodging, and medical facilities. Other land uses are compatible with expected noise exposure. The compatibility of existing and planned land uses is usually associated with the extent of the aircraft noise impacts. Actions to accommodate aircraft changes or the number of aircraft operations, or new routes are examples of activities that can alter aviation-related noise impacts and affect land uses subjected to those impacts. In this context, as the noise analysis described in the noise analysis section (Section 3.4) concludes that there is no significant impact, a similar conclusion may be drawn with respect to compatible land use.

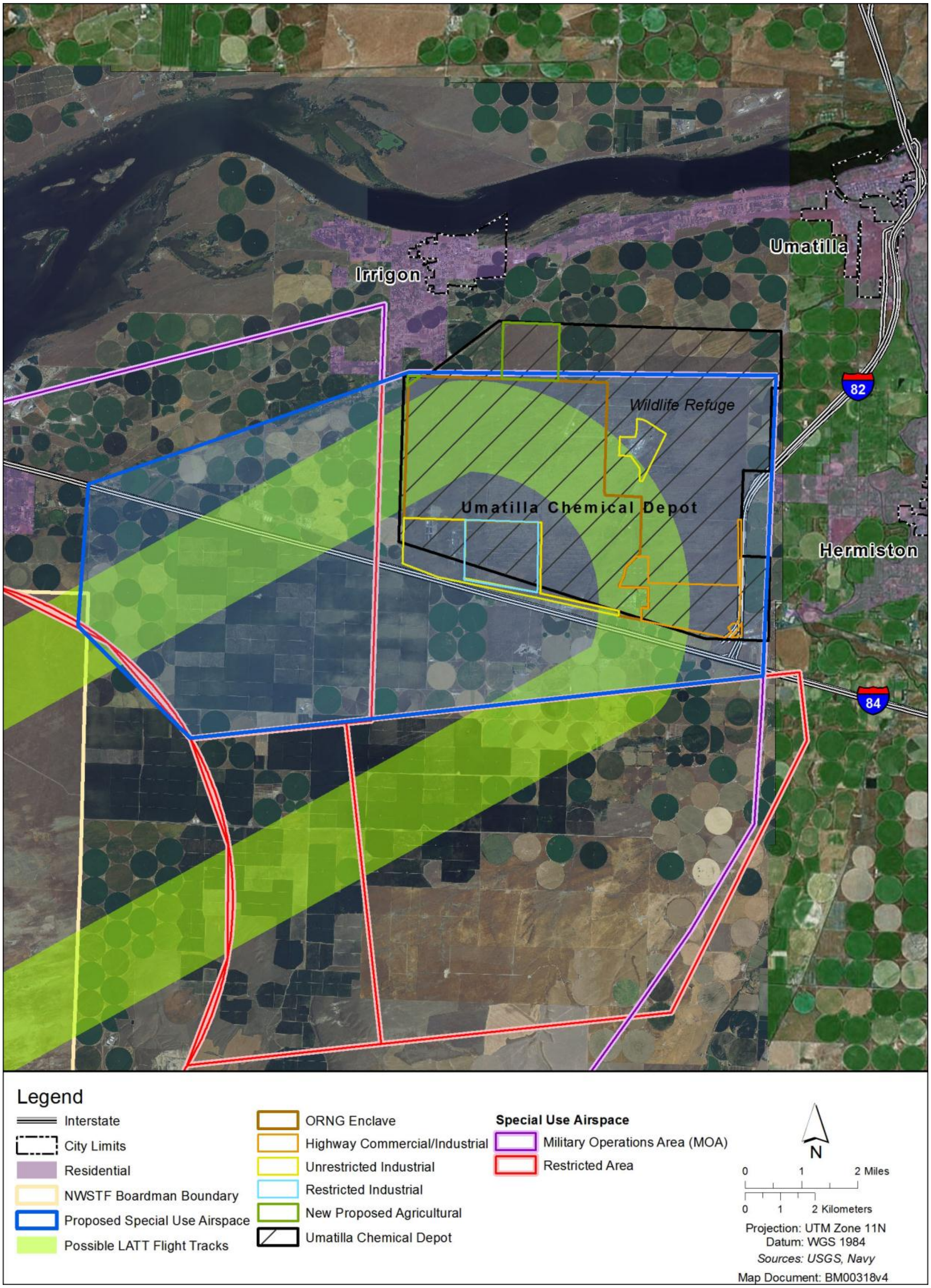

Figure 3.7-5: Land Reuse Authority Redevelopment Plan

3.7.3.2.2 Land Activities

Under Alternative 1, military use of NWSTF Boardman for training would continue, except that operation of additional live-fire gunnery training ranges and associated support facilities would be added to the activities conducted on the installation. These disturbed areas are restricted to the NWSTF Boardman facility, and do not change the land use of these areas, as the entire installation has been an operational DoD training range since withdrawal in 1941.

Usage of the ranges proposed under Alternative 1 may increase the amount of noise that propagates off range, or temporarily lower the regional air quality. These effects are expected to be minimal to moderate, though not expected to change the land use of adjacent lands, and are discussed fully in Section 3.2 (Air Quality) and Section 3.4 (Noise). Additionally, usage of the ranges by the Navy and Guard would increase the amount of traffic transiting to NWSTF Boardman, though the level of increase is expected to be minimal, as detailed in Section 3.9 (Transportation).

Ecological studies conducted pursuant to the NWSTF Boardman cooperative management agreement with the Nature Conservancy would be allowed to continue on NWSTF Boardman with researchers being required to schedule visits to NWSTF Boardman in advance, as they have in the past. Scheduling would become more difficult with the increased use of NWSTF Boardman for military training. Since these activities are consistent with established land uses within NWSTF Boardman, proposed increases in training activities under Alternative 1 would have no significant impact on current land use within the installation. For a discussion of potential impacts to biological resources, see Sections 3.5 (Vegetation) and 3.6 (Wildlife).

The proposed training or testing is not expected to alter or disrupt existing area land use to the extent that routine activities would no longer be feasible, or that the historical or current (i.e., agricultural) land use would be modified. Therefore, training and construction activities proposed under Alternative 1 would not significantly impact land use.

3.7.3.3 Alternative 2

Implementation of this alternative would include all elements of Alternative 1 (accommodating training activities currently conducted, increasing training activities, accommodating force structure changes, and implementing required range enhancements [with the exception of the DMPTR, which will not be constructed or operated under Alternative 2]). Additional range enhancements would be implemented, and could include the addition of three mortar pads, a second CLFR (western), and a new joint-use range operations control center.

3.7.3.3.1 Air Activities

Under Alternative 2, air training activities would continue to traverse public and private lands in existing NWSTF Boardman airspace. The number of fixed-wing and rotary-wing (non-UAS) sorties would increase from 847 to 1,627 under Alternative 2. The frequency of overflights would generally increase by up to 190 percent over existing conditions. While the total number of sorties would increase, typical flight paths for LATT would also change their orientation as a result of the addition of SUA (Boardman Low MOA and Boardman MOA [Proposed Extension]) (see Figure 3.7-4) in order to address recent windmill construction to the southeast of NWSTF Boardman airspace. Individuals underneath the flight paths of these activities would be exposed to aircraft noise. Flights over public and private lands would continue to be of short duration (with flights lasting 5–10 seconds at any point along the aircraft's flight path). Air operations would continue to be conducted in accordance with regulations for the use of aircraft targets, Restricted Areas, and MOAs/Air Traffic Control Assigned Airspace scheduled by NASWI (NASWHIDBEY INSTRUCTION 3770.1). Though the lower limit of the proposed airspace is 500 ft. (152.4 m) AGL, the typical flight path of aircraft that would operate in the northeast MOA is climbing from low-altitude training over NWSTF Boardman to higher elevations (while within the northeast MOA) in order to turn back towards the center of NWSTF Boardman. At these higher elevations, no changes to current or historical land uses are expected.

Under Alternative 2, the new MOA would be over the existing UCD and would include the associated NSA airspace. This NSA has a zone of surface to 5,000 ft. (1,524 m) and is only “active” during emergencies. At all other times this area is a recommended no fly zone, in which pilots could fly without prior notice to Seattle ARTCC. Additional lands underneath the northeast MOA would experience aircraft overflights though these events are not expected to influence ownership or management of the lands below the newly established MOA. Additionally, the placement of the northeast MOA is not anticipated to impact redevelopment of the UCD. However, with the lower limit of the proposed SUA being 500 ft. (152.4 m) AGL, the range of land uses below this MOA could be limited in the future in order to be compatible for safety purposes. According to 14 C.F.R. §91.119 (minimum safe altitudes) under FAA Guidelines, if a land use creates a “congested area” over a city, town, or settlement, or over any open air assembly of persons, then the minimum altitude of an aircraft would be restricted to 1,000 ft. (304.8 m) AGL. Therefore, with the proposed northeast MOA, any future land uses that could create a “congested area” would be restricted from development.

The FAA has established Restricted Areas for military operations, in this case, R-5701 [A-E] and R-5706. When military aircraft are conducting operations that are not compatible with civilian activity, the military aircraft are confined to the designated SUA, which is specifically designed for this purpose. Limitations outside of normal operating hours are communicated to commercial airlines and general aviation by NOTAMs, published by the FAA. With the increase in sorties under Alternative 2, there would be an associated increase in the number of activations/deactivations of the NWSTF Boardman Restricted Areas, limiting the availability of the airspace to non-participating aircraft. Airspace would continue to be made available for non-participating aircraft outside of training activity periods. From two hours after sunrise until two hours before sunset, LATT activities could occur in the MOA.

According to FAA and DoD policy, SUA should be made available for use by nonparticipating aircraft when all or part of the airspace is not needed by the using agency. To accommodate the joint use of SUA, a Letter of Agreement or a Letter of Procedure is drafted between the controlling agency and the using agency. In the case of R-5701 [A-E] and R-5706 within NWSTF Boardman, a Letter of Agreement is in place between Seattle ARTCC and NASWI. Through the Letter of Agreement, the Navy and FAA establishes the activation/deactivation procedures for the SUA (NASWHIDBEY INSTRUCTION 3770.1). Additionally, a Letter of Agreement would be put in place for the establishment of the northeastern MOA upon designation by the FAA.

Under Alternative 2, there would be a moderate decrease in both the available airspace and airspace time for non-participating aircraft within the restricted airspace. However, use of the restricted airspace by non-participating aircraft and scheduling would be allowed given proper authority and prior notifications. The northeast MOA would not limit use by non-participating aircraft although aircraft entering this area would need to maintain vigilance, especially from 2 hours after sunrise until 2 hours before sunset, which is when LATT activities could occur in the MOA. Although there is an expected decrease in availability of airspace to non-participating aircraft, this is not expected to alter or disrupt existing area land use to the extent that routine activities would no longer be feasible, or that the historical or designated land use would be modified. According to the Comprehensive Plans (Section 3.7.1.2) for the counties under the airspaces associated with Alternative 2, there are no projected changes in land use that would be impacted by the current or proposed airspaces.

Additionally, as listed in Section 3.4 (Noise), portions of lands to the west of NWSTF Boardman (conservation lands and agricultural lands) and east (agricultural lands) have a community DNL between 60 and 70 dBA as a result of military training activities. Community sound levels up to 65 dBA are compatible with land uses such as residences, transient lodging, and medical facilities. Other land uses are compatible with expected noise exposure. The compatibility of existing and planned land uses is usually associated with the extent of the aircraft noise impacts. Actions to accommodate aircraft changes or the number of aircraft operations, or new routes are examples of activities that can alter aviation-related noise impacts and affect land uses subjected to those impacts. In this context, as the noise analysis described in the noise analysis section (Section 3.4) concludes that there is no significant impact, a similar conclusion may be drawn with respect to compatible land use.

3.7.3.3.2 Land Activities

Under Alternative 2, military use of NWSTF Boardman for training would continue as discussed under the No Action Alternative, and operation of live-fire gunnery training ranges and associated support facilities would be added to the activities conducted on the installation as described for Alternative 1, with the exception being the DMPTR, which will not be constructed or operated under Alternative 2. Alternative 2 also includes the addition of three mortar pads, a second CLFR, and a new joint-use range operations control center. These disturbed areas are restricted to the NWSTF Boardman facility, and do not change the land use of these areas, as they are currently designated as military training space since the entire NWSTF Boardman is land withdrawn as a DoD operational range.

Usage of the ranges proposed under Alternative 2 may increase the amount of noise that propagates off range, or temporarily lower the regional air quality. These effects are expected to be minimal to moderate, though not expected to change the land use of adjacent lands, and are discussed fully in Section 3.2 (Air Quality) and Section 3.4 (Noise). As listed in Section 3.4 (Noise), portions of lands to the west of NWSTF Boardman (conservation lands and agricultural lands) and east (agricultural lands) have a community DNL between 60 and 70 dBA as a result of military training activities. Community sound levels up to 65 dBA are compatible with land uses such as residences, transient lodging, and medical facilities. Other land uses are compatible with expected noise exposure. Additionally, usage of the ranges by Navy and Guard would increase the amount of traffic transiting to NWSTF Boardman, though the level of increase is expected to be minimal and not affect regional land-use, as detailed in Section 3.9 (Transportation).

Ecological studies on NWSTF Boardman would be allowed to continue with researchers being required to schedule visits to NWSTF Boardman in advance, as they have in the past. Scheduling during certain times of the year (spring) or times of the week (weekends) would become more difficult with the increased use of NWSTF Boardman for military training. Since these activities are consistent with established land uses within NWSTF Boardman, proposed increases in training activities in Alternative 2 would have no significant impact on current land use within the training facility. For a discussion of potential impacts to biological resources, see Sections 3.5 (Vegetation) and 3.6 (Wildlife).

The proposed training or testing is not expected to alter or disrupt existing area land use to the extent that routine activities would no longer be feasible, or that the historical or current land use would be modified. Therefore, training and construction activities proposed under Alternative 2 would not significantly impact land use.

3.7.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.7.3.4.1 Proposed Management Practices

Management practices (MPs) in place for other resources (e.g., Acoustic Environment, Biological Resources, Wildfire), which affect land use on NWSTF Boardman, would continue to be implemented. These MPs would also serve to prevent impacts on land use surrounding NWSTF Boardman. No additional MPs are warranted for land use and recreation based on the analysis presented in Section 3.7.3 (Environmental Consequences).

3.7.3.4.2 Proposed Monitoring

No monitoring measures are warranted for land use and recreation based on the analysis presented in Section 3.7.3 (Environmental Consequences).

3.7.3.4.3 Proposed Mitigation Measures

No mitigation measures for are warranted for land use and recreation based on the analysis presented in Section 3.7.3 (Environmental Consequences) and implementation of current MPs.

3.7.3.5 Summary of Effects and Conclusions

Table 3.7-2 summarizes the effects and mitigation measures for all Alternatives.

Table 3.7-2: Summary of Effects

Stressor	Summary of Effects and National Environmental Policy Act Determinations
No Action Alternative	
Other Stressor Categories	
Air Activities	• Aircraft overflights associated with the No Action Alternative would not directly change the ownership, land use, management, recreation or visual setting of the area beneath it.
Land Activities	• Inland training activities are conducted within areas currently designated for military training use. Since these activities are consistent with established land uses within NWSTF Boardman, ongoing training activities have no impact on current land use within the training facility.
Impact Conclusion	• The No Action Alternative would not result in significant impacts on land use on or adjacent land use to NWSTF Boardman.
Alternative 1	
Other Stressor Categories	
Air Activities	• New aircraft overflights associated with Alternative 1 would not directly change the ownership, land use, management, recreation, or visual setting of the area beneath it. Restrictions on recreational use of the airspace during training activities would occur, however, these would be scheduled and notices to airmen would be issued. Aircraft activities would continue to occur over communities already subjected to these types of activities. • Under Alternative 1, the northeast MOA would not limit use by non-participating aircraft flying under Visual Flight Rules although aircraft entering this area would need to maintain vigilance, especially from two hours after sunrise until two hours before sunset, which is when LATT activities could occur in the MOA.

Table 3.7-2: Summary of Effects (continued)

Stressor	Summary of Effects and National Environmental Policy Act Determinations
Land Activities	• Proposed activities are consistent with established land uses within NWSTF Boardman, proposed increases in training activities would have no impact on current land use within the training facility. • The disturbed areas from proposed range enhancements are restricted to the NWSTF Boardman facility, and do not change the land use of these areas, as they are currently designated as military training space. • Usage of the ranges proposed under Alternative 1 may increase the amount of noise that propagates off range, or temporarily lower the regional air quality. These effects are expected to be minimal to moderate, though not expected to change the land use of adjacent lands
Impact Conclusion	• Alternative 1 would not result in significant impacts on land use on NWSTF Boardman. Alternative 1 would have impacts on the availability of area airspace for non-participatory aircraft. However, these impacts do not rise to the level of significance. Compatibility of existing and planned land uses is associated with the extent of the aircraft noise impacts. Actions to accommodate aircraft changes or the number of aircraft operations, or new routes are examples of activities that can alter aviation-related noise impacts and affect land uses subjected to those impacts. In this context, if the noise analysis described in the noise analysis section (Section 3.4) concludes that there is no significant impact, a similar conclusion usually may be drawn with respect to compatible land use. • The proposed training or construction is not expected to alter or disrupt existing area land use to the extent that routine activities would no longer be feasible, or that the historical or designated land use would be modified. The training and construction activities proposed under Alternative 1 would not significantly impact land use.
Alternative 2	
Other Stressor Categories	
Air Activities	• New aircraft overflights associated with Alternative 2 would not directly change the ownership, land use, management, recreation, or visual setting of the area beneath it. Restrictions on recreational use of the airspace during training activities would occur, however, these would be scheduled and notices to airmen would be issued. Aircraft activities would continue to occur over communities already subjected to these types of activities. • Under Alternative 2, the northeast MOA would not limit use by non-participating aircraft flying under Visual Flight Rules although aircraft entering this area would need to maintain vigilance, especially from two hours after sunrise until two hours before sunset, which is when LATT activities could occur in the MOA.
Land Activities	• Proposed activities are consistent with established land uses within NWSTF Boardman, proposed increases in training activities in Alternative 2 would have no significant impact on current land use within the training facility. • The disturbed areas from proposed range enhancements are restricted to the NWSTF Boardman facility, and do not change the land use of these areas, as they are currently designated as military training space. • Usage of the ranges proposed under Alternative 2 may increase the amount of noise that propagates off range, or temporarily lower the regional air quality. These effects are expected to be minimal to moderate, though not expected to change the land use of adjacent lands.

Table 3.7-2: Summary of Effects (continued)

Stressor	Summary of Effects and National Environmental Policy Act Determinations
Impact Conclusion	• Alternative 2 would not result in significant impacts on land use on NWSTF Boardman. Alternative 2 would have impacts on the availability of area airspace for non-participatory aircraft. However, these impacts do not rise to the level of significance. Additionally, as listed in Section 3.4 (Noise), portions of lands to the west of NWSTF Boardman (conservation lands and agricultural lands) and east (agricultural lands) have a community DNL between 60 and 70 dBA as a result of military training activities. Community sound levels up to 65 dBA are compatible with land uses such as residences, transient lodging, and medical facilities. Other land uses are compatible with expected noise exposure. The compatibility of existing and planned land uses is usually associated with the extent of the aircraft noise impacts. Actions to accommodate aircraft changes or the number of aircraft operations, or new routes are examples of activities that can alter aviation-related noise impacts and affect land uses subjected to those impacts. In this context, if the noise analysis described in the noise analysis section (Section 3.4) concludes that there is no significant impact, a similar conclusion usually may be drawn with respect to compatible land use. • The proposed training or construction is not expected to alter or disrupt existing area land use to the extent that routine activities would no longer be feasible, or that the historical or designated land use would be modified. The training and construction activities proposed under Alternative 2 would not significantly impact land use.

Notes: dBA = A-weighted decibel(s), NWSTF = Naval Weapons Systems Training Facility, MOA = Military Operations Area, LATT = Low-Altitude Tactical Training

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3.8 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.8.1 INTRODUCTION

This section evaluates effects related to socioeconomics and environmental justice (as required under Executive Order [EO] 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*).

3.8.1.1 Definition

Socioeconomics includes an evaluation of the basic attributes and resources associated with the human environment, particularly population, and economic activity. Economic activity encompasses employment, personal income, and industrial growth. Impacts on these fundamental socioeconomic components influence other issues, such as housing availability and provision of public services.

3.8.1.2 Federal Requirements

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The Council on Environmental Quality Guidance on Environmental Justice (December 10, 1997) provides direction on type of information generally used, requires that the analysis determine whether the proposed action has adverse human health effects on the minority populations, low-income populations, or American Indian tribes, and whether the proposed action has other adverse environmental effects or impacts on the minority populations, low-income populations, and American Indian tribes.[1]

Appendix A of the Council on Environmental Quality Guidance on Environmental Justice (December 10, 1997) provides specific guidance on Section 1-101 of EO 12898 to federal agencies for determining whether or not disproportionately high and adverse human health or environmental effects are caused by programs, policies, and activities. The guidance document includes:

> "When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:
>
> (a) Whether the health effects, which may be measured in risks and rates, are significant (as employed by the National Environmental Policy Act [NEPA]), or above generally accepted norms. Adverse health effects may include bodily impairment, infirmity, illness, or death; and
>
> (b) Whether the risk or rate of hazard exposure by a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and
>
> (c) Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards."

[1] The definitions for "low-income population," "minority," and "minority population" are found in Section 1-101 of EO 12898.

Further information is provided for determining disproportionate environmental effects in the guidance:

> "When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:
>
> (a) Whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment; and
>
> (b) Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and
>
> (c) Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards."

For this Proposed Action, analysis for EO 12898 requires assessment of readily available demographic data on the local, regional, and national populations, including race and ethnicity, age, income, and poverty metrics. Information to support this analysis is derived from the United States (U.S.) Census Bureau readily accessible documents and internet sites. The U.S. Decennial Census forms the basis of the data for 2000, which is completed every 10 years; the most recent census occurred in 2010. The U.S. Census Bureau 2010 Demographic Profile and the U.S. Census American Community Survey (ACS) for 2009–2013 data are used to document the most recent conditions.

3.8.1.3 Determination of Significance

Factors used to assess the significance of impacts on socioeconomics and environmental justice include the extent or degree to which an alternative would have a serious negative impact on regional and community economics, employment, housing, and population growth, as well as disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

3.8.2 AFFECTED ENVIRONMENT

3.8.2.1 Regional Setting

The Naval Weapons Systems Training Facility (NWSTF) Boardman is located in a rural urban area approximately 2.5 miles (mi.) (4.02 kilometers [km]) south of the City of Boardman. As presented in Section 3.7 (Land Use and Recreation), land use in the surrounding areas consists of agricultural lands, undeveloped areas, wind development projects, a tree farm to the east, a recreational trail to the south, and conservation areas to the west.

3.8.2.2 Region of Influence

The socioeconomic Region of Influence (ROI) includes Morrow County, Oregon, and portions of Gilliam County, Oregon and Umatilla County, Oregon (Figure 3.8-1) which may be affected by the

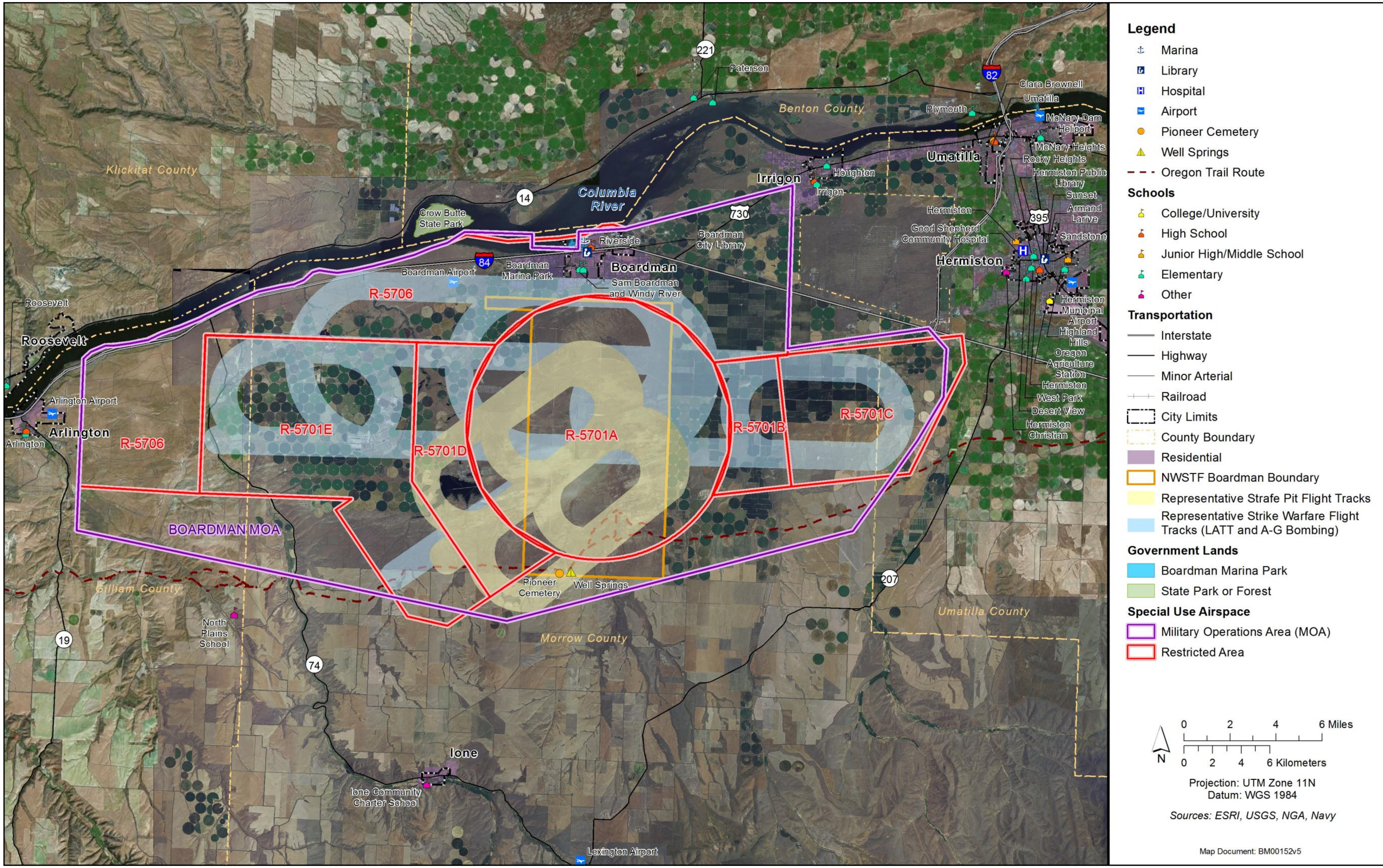

Figure 3.8-1: Special Use Airspace and Underlying Counties

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special use airspace of NWSTF Boardman, including those areas underlying the airspace, and those that are outside the airspace. The ROI was determined based on the potential for and the degree to which training activities could impact socioeconomic resources. The potential for impacts depends on the likelihood that the training activities would interact with public activities or infrastructure. Factors considered in the analysis include whether there would be temporal or spatial interfaces between the public or infrastructure and U.S. Department of the Navy (Navy) and Oregon National Guard (ORNG) training. Since participants in public activities or users of infrastructure could arrive from locations outside of the NWSTF Boardman airspace, the ROI is inclusive of this area for analysis. The City of Boardman and NWSTF Boardman are located within Morrow County. The summary of socioeconomics activity in the ROI is compiled from regional and federal government sources. In addition, data regarding minority and low-income populations is presented for the ROI and, for comparison purposes, on a state and national level.

3.8.2.3 Regional and Local Economy

3.8.2.3.1 Regional Employment

The economy of Morrow County is diversified; the leading employment sectors are agriculture and manufacturing services, retail trade, and hospitality. The largest employers in the area are Lamb-Weston (food preparation company), Oregon Potato Company, Portland General Electric Coal Fired Plant and Coyote Springs Co-Gen Plant, Morrow County School District, and Boardman Foods Incorporated. These employers account for over half of the total estimated employment for the City of Boardman. The estimated total employment for Oregon, Morrow County, and the City of Boardman for the years 2000 and 2010 is shown in Table 3.8-1. In general, the City of Boardman had a higher percent change in total employment between the 2000 and 2009–2013 data than Morrow, Umatilla, and Gilliam Counties and Oregon.

Table 3.8-1: Estimated Total Employment

	2000[1]	2009–2013	Percent Change
Oregon	1,742,638	1,961,278	12.5%
Gilliam County	941	1,005	6.8%
Umatilla County	31,068	35,975	15.7%
Morrow County	5,201	5,308	2%
City of Boardman	1,238	1,625	31.2%

[1] U.S. Census Bureau (2000)
[2] U.S. Census American Community Survey 2009–2013

From the 2009–2013 U.S. Census data, the county average unemployment rate was 10.9 percent, which is below the state rate of 11.3 percent and above the federal rate of 9.7 percent (U.S. Census Bureau 2009–2013). Six full-time military personnel are employed at NWSTF Boardman to support military readiness activities at the range.

3.8.2.4 Population and Housing

3.8.2.4.1 Regional Housing

According to the 2010 U.S. Census data, housing stock in Morrow County was 4,442 units and the housing stock in the City of Boardman was 1,017 units (Table 3.8-2). In general, the City of Boardman and Gilliam and Morrow County show a lower percent of increase in total housing units between the

2000 and 2010 data compared to Oregon. Additionally, Morrow County and the City of Boardman had no housing units built after 2010.

NWSTF Boardman serves as a regional range for Naval units homeported in the Pacific Northwest area; however, there is no military housing on the range. The full-time military personnel stationed at NWTSF Boardman live off base in the surrounding area.

Table 3.8-2: Estimated Total Housing Units

	2000[1]	2010[2]	Percent Change	Percent of Units Occupied 2010	Percent of Units Built after 2010[3]
Oregon	1,452,709	1,675,562	15.3%	90.6%	0.5%
Gilliam County	1,043	1,156	10.8%	74.7%	0.2%
Umatilla County	27,676	29,693	7.3%	90.6%	0.2%
Morrow County	4,276	4,442	3.8%	88.1%	0.0%
City of Boardman	947	1,017	7.4%	94.7%	0.0%

[1] U.S. 2000 Census
[2] U.S. 2010 Census
[3] U.S. Census American Community Survey 2009–2013

3.8.2.4.2 Population Demographics

Table 3.8-3 presents population characteristics, including the population in 2000, 2010, and the percent change in population between 2000 and 2010. In general, the City of Boardman has a higher percentage of change in population between the 2000 U.S. Census and the 2010 U.S. Census data compared to Morrow, Umatilla, and Gilliam Counties, and Oregon.

Table 3.8-3: Estimated Total Population Growth

	2000[1]	2010[2]	Percent Change from 2000 to 2010
Oregon	3,421,399	3,831,074	12%
Gilliam County	1,915	1,871	-2.3%
Umatilla County	70,548	75,889	7.6%
Morrow County	10,995	11,173	1.6%
City of Boardman	2,855	3,220	12.8%

[1] U.S. Census Bureau (2000)
[2] U.S. Census Bureau (2010)

Minority Populations

Table 3.8-4 provides the racial and ethnic composition for the city, county, state, and nation, using the 2000 and 2010 U.S. Census data. In general, the City of Boardman has a racial composition similar to the County of Morrow and Oregon. However, the City of Boardman has a higher percentage of Hispanic individuals than county, state, or national populations. Both Morrow and Umatilla counties have higher percentages of Hispanic individuals than state or national populations.

Table 3.8-4: Population, Race, and Ethnicity for the NWSTF Boardman Region of Influence

Race/Ethnicity	Census Years	City of Boardman	Morrow County	Umatilla County	Gilliam County	Oregon	USA
Total Population	2000[1]	2,855	10,885	70,548	1,915	3,421,399	281,421,906
	2010[2]	3,220	11,394	75,889	1,871	3,727,407	298,757,310
Percent (%) of Total Population							
White	2000	55.2	76.3	82.0	96.7	86.6	75.1
	2010	60.1	77.7	79.1	95.2	83.6	72.4
Black or African American	2000	0.4	0.1	0.8	0.1	1.6	12.3
	2010	0.7	0.5	0.8	0. 1	1.8	12.6
American Indian and Alaskan Native	2000	1.9	1.4	3.4	0. 8	1.3	0.9
	2010	0.9	1.2	3.5	1.0	1.4	0.9
Asian	2000	0.7	0.4	0.7	0.1	3.0	3.6
	2010	2.4	0.9	0.9	0.1	3.7	4.8
Native Hawaiian and Pacific Islander	2000	0.1	0.1	0.1	0	0.2	0.1
	2010	0.3	0.1	0.1	0.7	0.3	0.2
Other race	2000	38.7	19.5	10.7	1.1	4.2	5.5
	2010	33.0	16.9	12.5	0	5.3	6.2
Two or more races	2000	2.9	2.1	2.2	0.9	3.1	2.4
	2010	2.6	2.6	3.1	1.3	3.8	2.9
Hispanic[3]	2000	50.1	24.4	16.1	1.8	8.0	12.5
	2010	61.7	31.3	23.9	4.7	11.7	16.3

[1] U.S. Census Bureau (2000)

[2] U.S. Census Bureau (2010)

[3] The Hispanic category is an ethnic, rather than a racial, distinction. The individuals counted under other racial categories (white, black or African American, American Indian and Alaskan Native, Asian, Native Hawaiian and Pacific Islander, and other races) may also be categorized as Hispanic.

Note: USA = United States of America

Low-Income Populations

Table 3.8-5 depicts median household income and poverty levels for the city, county, state, and nation, using the 2000 census and 2009–2013 ACS data. In general, the City of Boardman has a median household income below Morrow County, Oregon, and the United States of America (USA). The City of Boardman also has a greater percentage of persons below the poverty level than Morrow County, Oregon, and the USA. Both Morrow and Umatilla counties have a higher percentage of persons below the poverty level than state and national populations.

Table 3.8-5: Low-Income Populations for the NWSTF Boardman Region of Influence

Metrics	Year	City of Boardman	Morrow County	Umatilla County	Gilliam County	Oregon	USA
Population	2000[1]	2,855	10,995	70,548	1,915	3,421,399	281,421,906
	2009–2013[2]	3,379	11,336	76,720	1,947	3,930,065	316,128,839
Median household income	2000	$32,543	$37,525	$36,249	$33,611	$40,916	$41,994
	2009–2013	$44,167	$49,940	$48,389	$44,743	$50,229	$53,046
% Persons below poverty	2000	20.1	14.8	12.7	9.1	11.6	12.4
	2009–2013	24.4	18	16.5	11.8	16.2	15.4

[1] U.S. Census Bureau (2000)
[2] U.S. Census American Community Survey 2005–2009
Note: USA = United States of America

3.8.2.5 Current Requirements and Management Practices

There are no current mitigation measures related to socioeconomics or environmental justice. However, current requirements and management practices (MPs), as well as mitigation measures in place for other resources (e.g., Air Quality, Water Resources, Noise, and Public Health and Safety), ensure that non-participants are not affected by actions on NWSTF Boardman.

3.8.3 Environmental Consequences

This section focuses on potential impacts and overall changes, as they relate to employment, housing, and minority and low-income populations associated with implementation of all current and proposed military readiness activities and proposed range enhancements at NWSTF Boardman (all of the land and air activities). An assessment of environmental justice is based on potential impacts associated with the land and air activities (air quality, water quality, noise, and public health and safety) from the Proposed Action. Air emissions and pollutants are addressed in Section 3.2 (Air Quality), in accordance with the Clean Air Act. Effects to water quality are addressed in Section 3.3 (Water Quality). The effects of noise from training and construction activities are addressed in Section 3.4 (Noise), and health and safety issues are addressed in Section 3.12 (Public Health and Safety and Protection of Children).

3.8.3.1 No Action Alternative

Under the No Action Alternative, the number of personnel stationed at NWSTF Boardman and tempo of training would remain unchanged.

3.8.3.1.1 Socioeconomics

No changes to the current socioeconomic conditions (employment, housing, and population growth) of Morrow County are expected under the No Action Alternative as the Navy would maintain baseline levels of personnel already employed at NWSTF Boardman and no changes in training would occur. Therefore, regional and community economics, employment, housing, and population growth are not affected as a result of the No Action Alternative.

3.8.3.1.2 Environmental Justice

Based on the analysis presented in this Environmental Impact Statement on Air Quality, Water Resources, Noise, and Public Health and Safety associated with the No Action Alternative, the following conclusions are presented in regard to human health and environmental effects to minority and low-income populations:

- Air Quality (Section 3.2) – Air emissions do occur from the No Action Alternative but are within or below historical or desired air quality conditions, and therefore do not pose disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
- Water Quality (Section 3.3) – There is little chance for an incidental spill to reach groundwater, if one were to occur, based on the response procedures in place and the small quantities of materials and wastes used and generated at NWSTF Boardman. Non-explosive practice munitions would have negligible effects on groundwater under the No Action Alternative because potential contaminants are not expected to migrate to groundwater. Domestic wastewater would continue to be treated by a septic system serving the Administrative Area. Based on the limited full time presence at NWSTF Boardman (six personnel), loadings to the system would be low and the effects to groundwater under the No Action Alternative would be negligible. While current groundwater usage data are not available for NWSTF Boardman, use is limited based on the number of full time personnel and the needs to support training. Because water discharges do not have significant impacts to the local water resources at NWSTF Boardman, they do not pose health or environmental risks to the surrounding communities. Therefore, there are no disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.
- Noise (Section 3.4) – Major sources of sound at NWSTF Boardman include aircraft (fixed-wing and helicopters) and weapons firing. Concerns related to noise from the No Action Alternative on the surrounding communities include potential hearing loss, non-auditory health effects, and speech interference/temporary attention. Sound impacts to community noise levels from military readiness activities under the No Action Alternative are negligible on lands outside of the Target Areas, and are partially mitigated by the training schedule. Military aircraft readiness activities on NWSTF Boardman occur primarily during the day, whereas individuals are most sensitive to sound at night. The areas surrounding NWSTF Boardman are primarily agricultural and, thus, very few members of the public are exposed to sound from military readiness activities on NWSTF Boardman.
- Public Health and Safety (Section 3.12) – The Navy has specific and documented procedures in place to ensure that non-participants, including children, are not endangered by Navy actions, including fencing, and signage. Therefore, there are no disproportionately high and adverse human health or environmental effects on minority populations or low-income populations.

No disproportionately high and adverse human health or environmental effects of the No Action Alternative are anticipated on minority and low-income populations. Minority and low-income populations are not significantly affected as a result of the No Action Alternative.

3.8.3.2 Alternative 1

Implementation of Alternative 1 would include an increase in existing military readiness activities, new military readiness activities, range enhancements including the construction of five new facilities at NWSTF Boardman, and the establishment and use of an additional Military Operations Area (MOA) to the northeast of the existing airspace.

3.8.3.2.1 Socioeconomics

Implementation of Alternative 1 would result in an increase of seven additional military personnel employed at NWSTF Boardman associated with the operation of the Unmanned Aircraft Systems (UAS) Training and Maintenance Facility. During drill weekends and annual training periods, a full platoon of 27 Soldiers would be present at the UAS facility. Under Alternative 1, an increase in the number of personnel at the UAS facility would have a beneficial effect on the local economy due to a possible increase in spending by military personnel employed and temporarily present for training at NWSTF Boardman.

Economic activity, such as local employment and materials purchasing associated with the proposed construction of five new facilities under Alternative 1, would provide short-term economic benefits to the local economy that would last for the duration of the construction; however, beneficial impacts from construction would be negligible on a regional scale. Other economic activity, such as the presence of non-local construction crews would also provide short-term economic benefits to the local economy for the duration of the construction activities; however, beneficial impacts from this activity would be negligible on a regional scale.

Under Alternative 1, the establishment and use of additional MOAs to the northeast of the existing airspace would occur (Figure 2-5). It is not anticipated that actions under Alternative 1 would affect local aviation traffic. Local aviators may coordinate activities that require entrance into Restricted Airspace during active hours with Air Traffic Control, and general flight publications and Notices to Airmen (NOTAMs) allow aviators the opportunity to plan around military readiness activities and coordinate flight times with Seattle Air Route Traffic Control Center (ARTCC). Local aviators are also allowed to operate under Restricted Areas (Restricted Area R-5706, for instance, has a base altitude of 3,500 ft. [1,066.8 m] Above Ground Level [AGL]). Though Low-Altitude Tactical Training (LATT) would occur within the new Boardman LOW MOA and Boardman MOA (proposed extension), training hour restrictions allow local aviators to plan their activities outside of the Navy training hours. Further, though the MOAs do not require clearance for local aviators to fly through, aviators may still coordinate with Seattle ARTCC if they need to fly during the timeframe of LATT activities. Pilots are still allowed to operate under Visual Flight Rules within the MOAs themselves without requiring authority (unless a Restricted Airspace is active). Therefore, while local aviators and activities will need to coordinate for inactive periods for use of the airspace, economic activity, such as local employment, farming or ranching operations, would not be significantly impacted. For more detail, please see Section 3.9 (Transportation).

3.8.3.2.2 Environmental Justice

Based on the analysis presented herein on air quality, water resources, noise, and public health and safety associated with Alternative 1, the following conclusions are presented in regards to human health and environmental effects to minority and low-income populations:

- Air Quality (Section 3.2) – Air emissions do occur from Alternative 1 but do not pose human health or environmental risks to surrounding communities as the status of the air quality in the Eastern Oregon Intrastate Air Quality Control Region 191 would not be affected. Therefore, air quality emission with implementation of Alternative 1 would not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations.

- Water Quality (Section 3.3) – Given the region's environmental conditions, it is unlikely that an incidental spill would reach groundwater, if one were to occur, based on the response procedures in place and the small quantities of materials and wastes used and generated at NWSTF Boardman. The increase in the number of non-explosive practice munitions would have negligible effects on groundwater under Alternative 1 because operational range assessments and range management would maintain the range, and soil and water conditions are such that contaminants are not expected to migrate to groundwater (e.g., refueling of tracked vehicles would be done pursuant to the spill management plans). Domestic wastewater would continue to be treated by a septic system serving the Administrative Area. Additionally, the UAS Training and Maintenance Facility/Range Operations Control Center would share a septic system, and a well would be drilled for non-potable water. Based on the limited full time presence at NWSTF Boardman (the current six personnel plus the additional seven personnel for the UAS Training and Maintenance Facility), loadings to the system would be low and the effects to groundwater under Alternative 1 would be negligible. While current groundwater usage data are not available for NWSTF Boardman, use is limited based on the limited number of full time personnel and the limited needs to support training. Because water discharges do not have significant impacts to the local water resources at NWSTF Boardman, they do not pose health or environmental risks to the surrounding communities. Therefore, water quality with implementation of Alternative 1 would not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations.
- Noise (Section 3.4) – Major sources of sound includes aircraft (fixed-wing and helicopters) and weapons firing. Concerns related to noise from Alternative 1 on the surrounding communities would include potential hearing loss, non-auditory health effects, and speech interference/temporary attention. Under Alternative 1, construction related noise would be short-term and negligible and would not propagate beyond NWTSF Boardman boundaries. The addition of the proposed MOAs and increase in Low-Altitude Tactical Training within the proposed MOAs, current MOA, and current Restricted Areas would generate levels of sudden-onset pass-by aircraft sound, but few individuals would be close enough to the aircraft to hear such sounds, as these activities would occur over agricultural and non-residential areas. Based on the distribution and magnitude of noise impacts under Alternative 1, communities surrounding NWSTF Boardman and those located under the current and proposed MOAs, as well as the Restricted Areas, would continue to be slightly affected by training noise. A very small portion of the area outside of the NWSTF Boardman boundary (0.94 square miles [mi.^{2}] [2.4 square kilometers {km^2}]) experiences a community Day Night Sound Level (DNL) between 70 and 75 A-weighted decibels (dBA) under Alternative 1. This is a reduction in area of approximately 171.5 mi.^{2} that was between 70 and 75 dBA under the No Action Alternative. Visual inspection of aerial maps of the areas within regions where the DNL is in excess of 65 dBA reveals that the majority of the area is utilized for agricultural purposes. However, several structures were identified, most notably on lands underneath Restricted Areas R5701C and R5701E. At these specific locations (15 private residences within agricultural areas, as compared to 47 under the No Action Alternative), during busy months of training activities at NWSTF Boardman, noise would interfere with normal activities associated with their use; however, these interferences would be less than those experienced under the No Action Alternative, and noise from aircraft activities under Alternative 1 would not represent significant degradation in the noise environment. Therefore, acoustic emissions with implementation of Alternative 1 would not result in disproportionately high and adverse human health or environmental effects on minority and low-income populations.

- Public Health and Safety (Section 3.12) – The Navy has specific and documented procedures in place to ensure that non-participants, including children, are not endangered by Navy actions, including fencing, and signage.

Minority and low-income populations are not affected as a result of Alternative 1. Therefore, no disproportionately high and adverse human health or environmental effects as a result of implementation of Alternative 1 are anticipated on minority and low-income populations.

3.8.3.3 Alternative 2

Alternative 2, the Preferred Alternative, would include all elements of Alternative 1 (with the exception of the Digital Multipurpose Training Range, which will not be constructed or operated under Alternative 2). In addition, Alternative 2 would include additional range enhancements (three mortar-firing positions, a second Convoy Live Fire Range, and a new joint-use Range Operations Control Center (separate from the UAS facility) and additional training associated with mortar firing practice.

3.8.3.3.1 Socioeconomics

Under Alternative 2, impacts would be similar to those described under Alternative 1. Increases in personnel at NWSTF Boardman and military readiness activities would have a beneficial effect on the local economy due to an increase in spending by military personnel employed at NWSTF Boardman. The establishment and use of additional MOAs to the northeast of the existing airspace would occur (Figure 2-5); however, economic activity, such as local employment, farming or ranching operations, would not change.

Economic activity, such as local employment and materials purchasing associated with the proposed construction of new facilities under Alternative 2, would provide short-term economic benefits to the local economy that would last for the duration of the construction; however, beneficial impacts from construction would be negligible on a regional scale. Other economic activity, such as the presence of non-local construction crews, would also provide short-term economic benefits to the local economy for the duration of the construction activities; however, beneficial impacts from this activity would be negligible on a regional scale. The presence of Guard and Navy training units would have no net economic impact on a regional scale since personnel associated with military readiness activities would mainly remain within NWSTF Boardman.

Under Alternative 2, there would be no economic impact from construction activities related to farming and ranching operations or other activities on neighboring lands and areas under military airspace because construction of the additional facilities would occur within NWSTF Boardman range boundaries. While local activities would need to schedule for use of airspace, there would be no significant impact or change in economic activity under Alternative 2.

3.8.3.3.2 Environmental Justice

Under Alternative 2, Air Quality, Water Resources, Acoustic Environment, and Public Health and Safety effects would be similar to those described under Alternative 1, where minority and low-income populations would not be affected as a result of activities associated with Alternative 1. Therefore, no disproportionately high and adverse human health or environmental effects as a result of implementation of Alternative 2 are anticipated on minority and low-income populations.

3.8.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.8.3.4.1 Proposed Management Practices

No adverse socioeconomic effects were identified; therefore, no proposed MPs for socioeconomics and environmental justice are warranted. However, MPs for other resources that affect environmental justice (e.g., Air Quality, Water Quality, and Noise) would be implemented.

3.8.3.4.2 Proposed Monitoring

No specific monitoring needs were identified for socioeconomics and environmental justice.

3.8.3.4.3 Proposed Mitigation Measures

Management practices in place for other resources (e.g., Air Quality, Water Quality, and Noise) would continue to be implemented. These MPs would also serve to prevent impacts socioeconomics and environmental justice. No additional MPs are warranted for socioeconomics and environmental justice based on the analysis presented in Section 3.8.3.

3.8.3.5 Summary of Effects and Conclusions

Table 3.8-6 summarizes the effects of and mitigation measures for the No Action Alternative, Alternative 1, and Alternative 2 under Socioeconomics and Environmental Justice.

Table 3.8-6: Summary of Effects for Socioeconomics and Environmental Justice

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative	
Land and Air Activities	
Socioeconomics	• Regional and community economics, employment, housing, and population growth are not affected as a result of the No Action Alternative.
Impact Conclusion	• The No Action Alternative would result in no significant impacts to the regional and community economics, employment, housing, and population. • There are no disproportionately high and adverse human or environmental effects of the No Action Alternative on minority and low-income populations.
Alternative 1	
Land and Air Activities	
Socioeconomics	• Beneficial effects on the local economy due to an increase in spending by both the additional full-time military personnel employed by NWSTF Boardman and the increased military personnel participating in military readiness activities while in the local area. • Economic activity would provide short-term economic benefits to the local economy; however, beneficial impacts from range development would be negligible on a regional scale. • Local activities would need to schedule for use of airspace, but there would be no significant impact or change in economic activity related to farming and ranching operations.
Impact Conclusion	• Alternative 1 would result in no significant impacts on the socioeconomics of the Boardman region. • There are no disproportionately high and adverse human or environmental effects of Alternative 1 on minority and low-income populations.

Table 3.8-6: Summary of Effects for Socioeconomics and Environmental Justice (continued)

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
Alternative 2	
Land and Air Activities	
Socioeconomics	• Beneficial effects on the local economy due to an increase in spending by both the additional full-time military personnel employed by NWSTF Boardman and the increased military personnel participating in military readiness activities while in the local area. • Economic activity would provide short-term economic benefits to the local economy; however, beneficial impacts from range development would be negligible on a regional scale. • Local activities would need to schedule for use of airspace, but there would be no significant impact or change in economic activity related to farming and ranching operations.
Impact Conclusion	• Alternative 2 would result in no significant impacts on the socioeconomics of the Boardman region. • There are no disproportionately high and adverse human or environmental effects of Alternative 2 on minority and low-income populations.

Note: NWSTF = Naval Weapons Systems Training Facility

3.9 TRANSPORTATION

This section addresses potential impacts of the alternatives, including the Proposed Action, on transportation in the vicinity of Naval Weapons Systems Training Facility (NWSTF) Boardman and the surrounding areas of the City of Boardman and Morrow County, focusing on vehicular and air traffic.

3.9.1 INTRODUCTION

3.9.1.1 Definition

In this section, transportation refers to the movement of vehicles on roadways and aircraft in the sky near NWSTF Boardman.

3.9.1.2 Determination of Significance

Factors used to assess the significance of impacts on vehicle traffic include the extent or degree to which an alternative would seriously disrupt the flow of residential or highway traffic. The Federal Highway Administration uses level of service to measure the effectiveness and quality of transportation infrastructure. Level of service analyzes road traffic flow with corresponding safe driving conditions, and has the following level of service A through F rating system:

- Level of service A = Free flow
- Level of service B = Reasonably free flow
- Level of service C = Stable flow
- Level of service D = Approaching unstable flow
- Level of service E = Unstable flow
- Level of service F = Forced or breakdown flow

A serious disruption to vehicular traffic occurs when the level of service of an area increases to an unacceptable level of service of D or higher. Personnel transiting roadways at intersections do so upon appropriate traffic cycles and do not disrupt roadway traffic. Factors used to assess the significance of impacts on air traffic include consideration of an alternative's potential to result in (1) an airspace modification that would cause disruption to commercial air traffic patterns, or (2) air operations that will markedly restrict civilian aviation in the project area.

3.9.2 AFFECTED ENVIRONMENT

Road and highway networks consist of primary roads and secondary roads. Primary roads are principal arterials, such as interstate freeways and state highways, designed to move vehicle traffic. Primary roads provide limited access to adjacent areas. Secondary roads are arterials such as major surface streets that provide access to residential, commercial, and recreational areas; public service facilities such as hospitals and schools; government facilities, and other commonly accessed infrastructure. Secondary roads also collect traffic from common areas and transfer it to primary roads.

3.9.2.1 Key Regional Roadways

The principal regional access to NWSTF Boardman is by Interstate 84, which divides the City of Boardman, with one-third to the north and two-thirds to the south. Interstate 84 is a major east-west route in the federal highway system that connects Portland with Boise, Idaho, and Salt Lake City, Utah. The Interstate is the primary access in and out of the City of Boardman (Figure 3.9-1). Exit 168 on Interstate 84, east of the City of Boardman, serves United States (U.S.) Highway 730 to the north and Bombing Range Road to the south. The portion of Bombing Range Road that is adjacent to NWSTF

Boardman is owned by the U.S. Department of the Navy (Navy), and is not anticipated to be restricted from public use in the future.

The Interstate 84-Main Street Boardman interchange (exit 164) is the primary traffic generator and access to both the north and south sides of the City of Boardman. The other interchange (exit 165) in the City of Boardman is located at the east end of the city and provides primary access to the Port of Morrow.

The 2009 *Morrow County Transportation System Plan* indicates that the current intersection levels of service reported for Boardman are all in the acceptable level of service A or B range. To maintain an acceptable operating standard, the transportation system plan sets level of service C as the minimum acceptable level for the unincorporated areas of the County and level of service D for the areas surrounding the cities within urban growth boundaries. The projected level of service in 2024 is projected to be level D or better for Morrow County (KCM 2009). Existing average daily traffic volumes range from 13,800 vehicles on Interstate 84 west of U.S. 730, to less than 1,500 vehicles on the rest of the highways within the county, most of which carry less than 500 daily vehicles. Bombing Range Road has an average daily traffic volume of 1,250 vehicles, making it one of the highest daily volume roads in the county (KCM 2009).

3.9.2.2 Installation Roadways and Gates

Access to and from NWSTF Boardman is from Bombing Range Road that can be accessed from the north or the south through the City of Boardman local roads and from Exit 168 on Interstate 84/State Route 30 (Figure 3.9-1). From the south, Bombing Range Road is accessible via Oregon Route 207-Lexington-Echo Highway. Although Bombing Range Road lies on the eastern boundary of Boardman Range and belongs to the Navy, the Navy has never shut off road access to Bombing Range Road, nor does it plan to. In addition to the main gate on Bombing Range Road, the facility has an additional locked gate at the northwest corner of the installation that is presently only used for emergency or range monitoring purposes (Figure 3.9-1).

3.9.2.3 Air Traffic

Air traffic refers to movements of aircraft through airspace. Safety and security factors dictate that use of airspace and control of air traffic be closely regulated. Accordingly, regulations applicable to all aircraft are promulgated by the Federal Aviation Administration (FAA) to define permissible uses of designated airspace, and to control that use. Figure 3.9-2 displays the current airspaces at NWSTF Boardman.

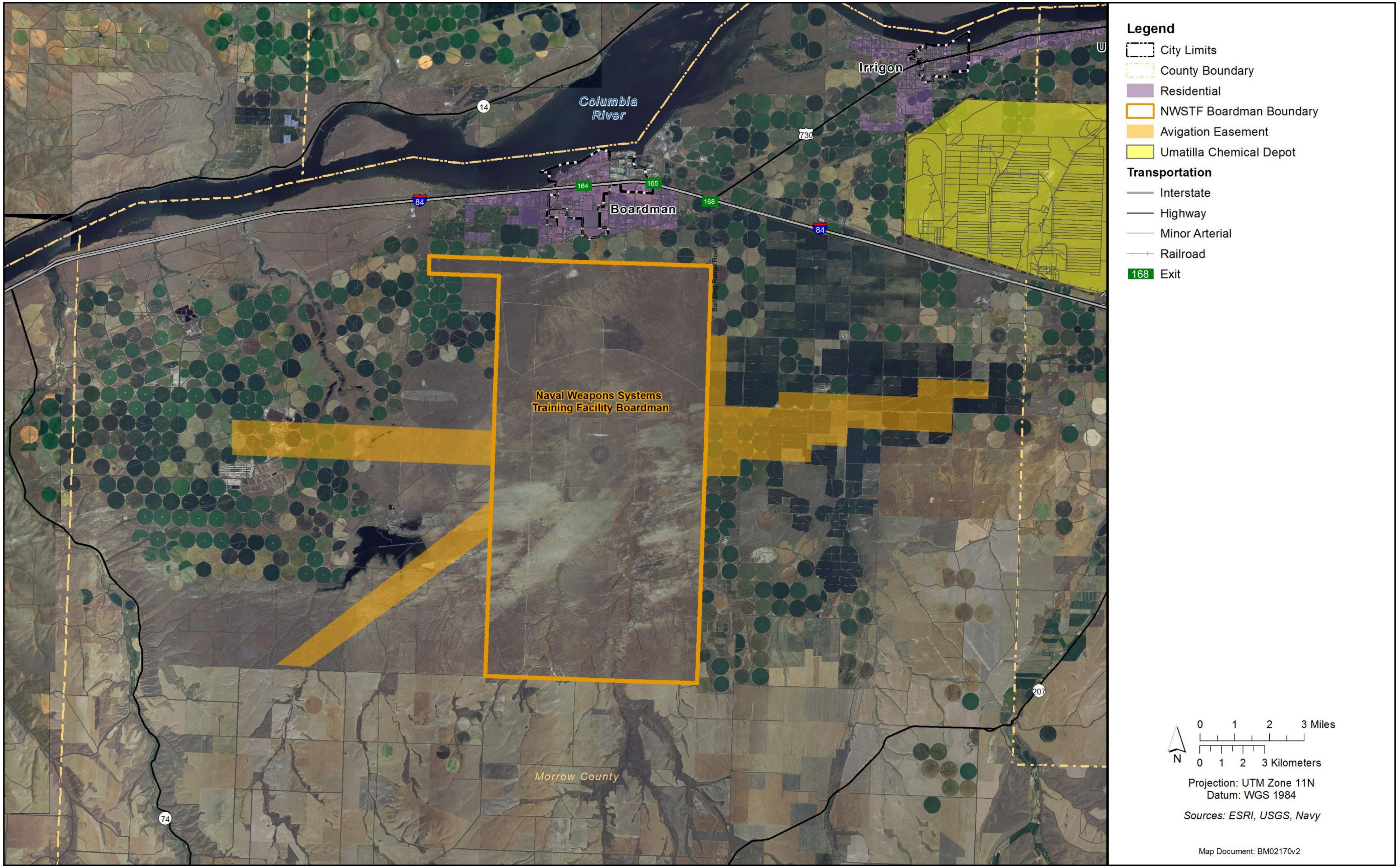
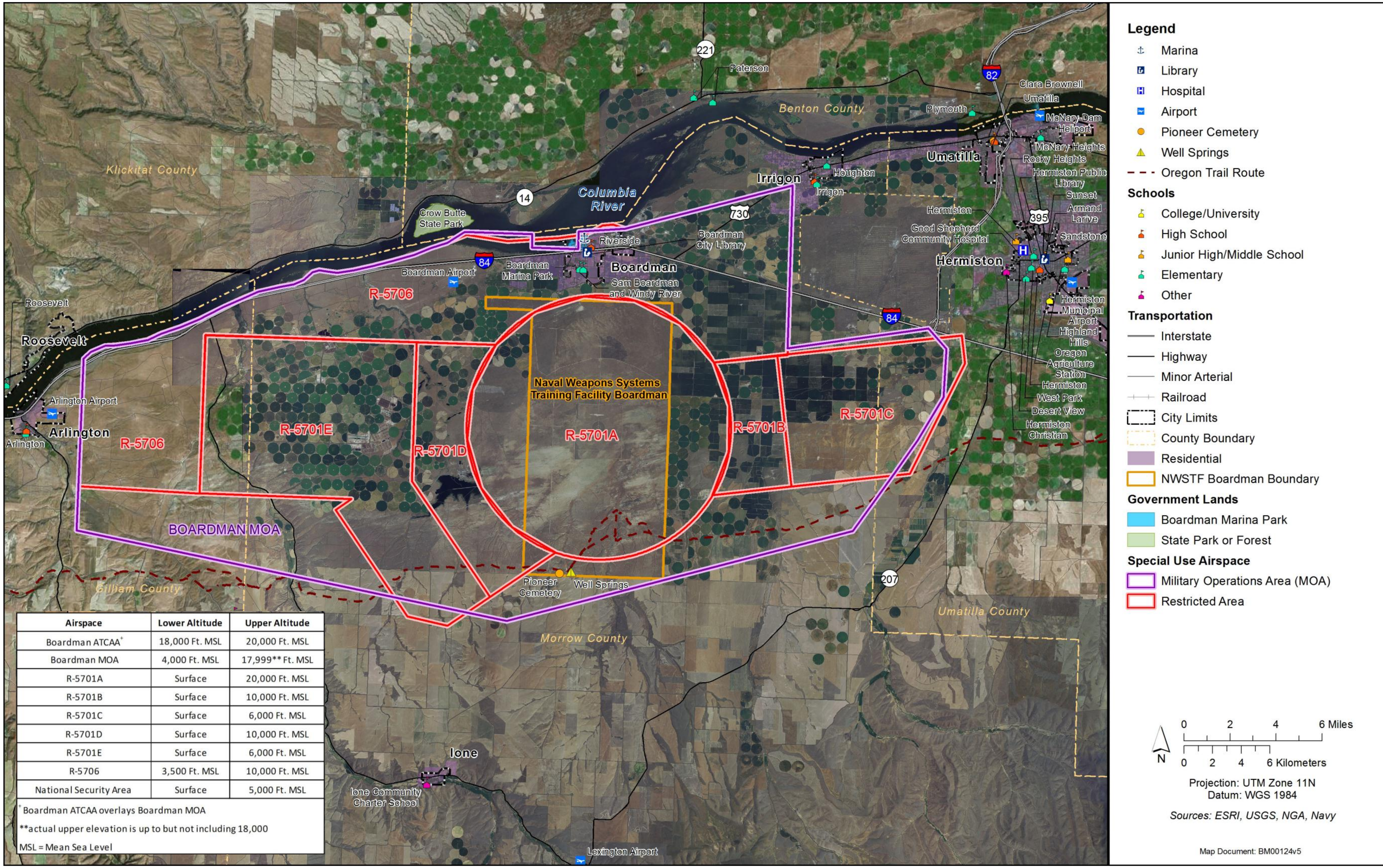


Figure 3.9-1: Regional Roadways



Airspace	Lower Altitude	Upper Altitude
Boardman ATCAA*	18,000 Ft. MSL	20,000 Ft. MSL
Boardman MOA	4,000 Ft. MSL	17,999** Ft. MSL
R-5701A	Surface	20,000 Ft. MSL
R-5701B	Surface	10,000 Ft. MSL
R-5701C	Surface	6,000 Ft. MSL
R-5701D	Surface	10,000 Ft. MSL
R-5701E	Surface	6,000 Ft. MSL
R-5706	3,500 Ft. MSL	10,000 Ft. MSL
National Security Area	Surface	5,000 Ft. MSL

* Boardman ATCAA overlays Boardman MOA

**actual upper elevation is up to but not including 18,000

MSL = Mean Sea Level

Figure 3.9-2: Existing Airspace at NWSTF Boardman

These regulations are intended to accommodate the various categories of aviation, whether military, commercial, or general aviation. The regulatory scheme for airspace and Air Traffic Control (ATC) varies from highly controlled to uncontrolled. Less controlled situations include flight under Visual Flight Rules (VFR) or flight outside of U.S. controlled airspace. Examples of highly controlled air traffic situations are flights in the vicinity of airports, where aircraft are in a critical phase of flight, either take-off or landing, flights along Victor airways, and flights under Instrument Flight Rules (IFR), particularly flights on high or low-altitude airways. Victor airways are pre-determined routes flown by pilots under IFR. They are defined by VHF omnidirectional range (VOR) radials and have established minimum (and possibly maximum) altitudes at which they may be flown. Victor airways are, by definition, surrounded by Class E airspace from 1,200 feet (ft.) (370 meters [m]) above ground level (AGL) up to, but not including, 18,000 ft. (5,500 m) above mean sea level. These virtual airways are defined primarily by VORs, and comprise a system of established routes that run along specified VOR radials, hence the beginning letter V.

There are several airports in the Boardman area—the Boardman Airport, Boardman Heliport (Portland General Electric Boardman Heliport), Simtag Farms Airport, Arlington Municipal Airport, Hermiston Municipal Airport, and the Good Shepherd Hospital Heliport. Boardman Airport is a public airport located 4 miles (mi.) (6.4 kilometers [km]) southwest of the City of Boardman in Morrow County (Figure 3.9-1). The airport was built by the United States Army Air Corps in 1942 as an emergency landing airfield for military aircraft on training flights. It was closed after World War II, and was turned over for local government use. The Boardman Heliport is a private heliport located approximately 16 mi. (25.8 km) southwest of the City of Boardman, and is approximately 90 ft. by 90 ft. (27.4 m by 27.4 m). The Simtag Farms Airport is a private airport located approximately 17 mi. (27.4 km) southwest of the city of Boardman, contains one single-engine plane, and has a 4,000 ft. by 32 ft. (1,219.2 m by 9.8 m) runway. Arlington Municipal Airport contains one runway (with a dirt surface measuring 5,000 x 50 ft. [1,524 x 15 m] and is used primarily for general aviation. Insitu uses the airport as a testing location for their unmanned aircraft vehicles, which launch from Arlington and fly into the NWSTF Boardman airspace under a FAA Certificate of Authorization. Good Shepherd Hospital Heliport is approximately 2.80 miles from the eastern edge of the Military Operations Area (MOA); if needed, the helicopter can fly under the MOA airspace. Additionally, the Hospital Helicopter would be given priority as it is a lifeguard helicopter and real time adjustments to airspace would be made to expedite the transport.

The primary purposes of aviation in the Boardman region are for commercial flights, the use of crop dusters for agricultural lands, and recreational flying. Due to the irregular shape of NWSTF Boardman airspace, the use of military training routes, adjacent commercial airports, and civilian agricultural land, four Visual Flight Route Military Training Routes (VRs) and three Instrument Flight Route Military Training Routes (IRs) are present in the Boardman area. These are VR 1355, which runs in a northwest direction out of the Boardman MOAs; VR 1350-1351, which runs into the Boardman MOA from the northeast; VR 1353, which runs into the Boardman MOA from the southwest; VR 1354, which runs out of the Boardman MOA to the northeast; and IR 346, 344, and 342 which run along the same path as VR 1353 from the southwest.

There are two additional airports within the region that could potentially be affected by the proposed Boardman Low MOA and Boardman MOA (Proposed Extension): the Hermiston Municipal Airport, which is approximately 30 mi. (48.3 km) east of Boardman; and the McNary Dam Heliport in Umatilla, which is approximately 19 mi. (30.6 km) northeast of the city of Boardman.

3.9.2.3.1 Special Use Airspace

Special Use Airspace (SUA) refers to areas with defined dimensions where flight and other activities are confined due to their nature and the need to restrict or limit nonparticipating aircraft. The majority of SUA is established for military flight activities and may be used for commercial or general aviation when not reserved for military activities. There are multiple types of SUA. One type of SUA, of particular relevance to NWSTF Boardman, is a Restricted Area, which is defined in 14 Code of Federal Regulations (C.F.R.) § 73 as follows:

> "A restricted area is airspace designated under Part 73 within which the flight of aircraft, while not wholly prohibited, is subject to restriction."

The reference to 14 C.F.R. § 73 designates that: "No person may operate an aircraft within a restricted area between the designated altitudes and during the time of designation, unless he has the advance permission of the controlling agency." At NWSTF Boardman, the scheduling authority is Naval Air Station (NAS) Whidbey Island, which is also the using agency, and Seattle Air Route Traffic Control Center (ARTCC) is the controlling authority.

NWSTF Boardman contains two restricted areas that extend over the City of Boardman and Morrow, Umatilla, and Gilliam Counties: R-5701 [A-E] and R-5706. The U.S. Army Umatilla Chemical Depot (UCD), approximately 13 mi. (20.9 km) northeast of NWSTF Boardman, used to have the Restricted Area R-5704 over the western portion of the installation from surface to 4,000 ft. (1,219.2 m) mean sea level (MSL). However, R-5704 was terminated under the 1988 Department of Defense Base Realignment and Closure initiative. A National Security Area (NSA) existed over the UCD but was disestablished May 28, 2015. A NSA consists of airspace with defined vertical and lateral dimensions established at locations where there is a requirement for increased security of ground facilities.

Other types of SUA found within NWSTF Boardman include the Boardman MOAs and Boardman Air Traffic Control Assigned Airspace (ATCAA) (Figure 1-2). According to the 14 C.F.R. §1.1, a MOA is airspace established outside Class A airspace (18,000 to 60,000 ft. [5,486.4 to 18,288 m] MSL) to separate or segregate nonhazardous military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. MOAs do not restrict VFR operations; however, pilots operating under VFR should exercise extreme caution while flying within, near, or below an active MOA. Additionally, ATCAA is airspace of defined vertical/lateral limits that is assigned by ATC for the purpose of providing air traffic segregation between the specified activity being conducted within the assigned airspace and other IFR traffic. Current Restricted Areas and SUAs for Boardman can be found in the FAA Joint Order 7400.8, which states that training periods are designated Monday through Friday from 0730–2359, and other training times outside of these designated times will be by Notice to Airmen (NOTAMs) 6 hours in advance of event (Federal Aviation Administration 2011). In addition to the FAA Joint Order 7400.8, Restricted Areas and Special Use Areas can be found on standard aviation charts.

3.9.2.4 Current Requirements and Management Practices

The Navy strives to ensure that it retains access to training areas and SUA as necessary to accomplish its mission, while facilitating joint military-civilian use of such areas to the extent practicable and consistent with safety. These goals of military access, joint use, and safety are promoted through various coordination and outreach measures, including:

- In the case of R-5701 [A-E] and R-5706 within NWSTF Boardman, a Letter of Agreement is in place between Seattle ARTCC and NAS Whidbey Island. Through the Letter of Agreement, the

Navy and FAA establish the activation/deactivation procedures for the SUA. (NASWHIDBEY INSTRUCTION 3770.1). R-5701, R-5706, and Boardman MOA activated from 0730 to 2359 Monday through Friday, and at other times by NOTAMs (6 hours advance notice).

- Any new MOA, upon designation by the FAA, would be addressed through an update to the existing or a new Letter of Agreement.
- Non-participating aircraft are prohibited from entering the Restricted Areas at NWSTF Boardman unless they have prior approval from the controlling authority (Seattle ARTCC). Non-military aviators must coordinate any flight activities that require entrance at any time into the Restricted Airspace with Seattle ARTCC, who in turn works with local aviators and the military training schedules to determine available flight times. If scheduling conflicts arise, Seattle ARTCC contacts the local aviator. Future requirements may be requested with NAS Whidbey Island Range Schedules and accommodated with a “non-activation” of the airspace if it is not otherwise scheduled.

3.9.3 Environmental Consequences

The transportation analysis addresses air and road traffic at NWSTF Boardman. The principal issue is the potential for existing or proposed military air or road traffic to affect existing transportation conditions. Impacts on traffic were assessed with respect to the potential for disruption of transportation pattern and systems, and changes in existing levels of transportation safety.

3.9.3.1 No Action Alternative

3.9.3.1.1 Land Activities

Under the No Action Alternative, military readiness activities along Bombing Range Road are not estimated to generate any trips through the City of Boardman. Military readiness activities under the No Action Alternative would continue to vary from basic individual to unit level events of relatively short duration involving few participants, and would therefore have a less than significant impact on vehicle traffic in the action area.

3.9.3.1.2 Air Activities

Under the No Action Alternative, the current Restricted Areas R-5701 (A-E) and R-5706, as well as the current Boardman MOA and ATCAA, would remain unchanged. Non-participating aircraft are prohibited to enter Restricted Areas at NWSTF Boardman unless they have prior approval from the controlling authority (Seattle ARTCC). Non-military aviators must coordinate any flight activities that require entrance at any time into the Restricted Airspace with Seattle ARTCC, who in turn works with local aviators and military training schedule to determine available flight times.

The NWSTF Boardman MOA separates non-participating IFR traffic during military readiness activities, but it does not restrict VFR operations. While VFR operations are not restricted in a MOA, it is not advised to fly in a MOA while the airspace is active. Pilots who still choose to operate under VFR should exercise extreme caution while flying within, near, or below an active MOA. The current NWSTF Boardman MOA has a base altitude of 4,000 ft. (1,219.2 m) MSL, and Restricted Area R-5706 has a base altitude of 3,500 ft. (1,066.8 m) MSL and, therefore, general aviation such as crop dusting and other activities are not limited under the No Action Alternative if those activities occur in areas of the MOA that are not within active Restricted Airspace. As described above, flight activities that require entry into Restricted Airspace require approval from Seattle ARTCC.

The availability of airspace can be found in general flight publications, or through NOTAMs if the airspace is active other than what is published in the flight information publication. R-5701, R-5706, and the Boardman MOA are activated from 0730 to 2359 Monday through Friday, and at other times by NOTAMs (6 hours advance notice). The airspace is not active for military UAS activities on Saturday or Sunday, which operate under VFR. Non-participating aircraft may use the airspace outside of these active hours, though still require coordination with Seattle ARTCC.

The No Action Alternative would not have any major effects on local aviation traffic. Local aviators may coordinate activities that require entrance into Restricted Airspace during active hours with Seattle ARTCC. General flight publications and NOTAMs allow aviators the opportunity to plan around military readiness activities and coordinate flight times with Seattle ARTCC. Victor routes do not conflict or come into NWSTF Boardman's airspace. There are only three jet routes that cross NWSTF Boardman's airspace (J16, J54, and Q154); however, J16 and J54 have a minimum IFR en route altitude of 29,000 ft., Q154 has a minimum IFR en route altitude of 24,000 ft., and they would therefore not interfere or have any effect on NWSTF Boardman's airspace. Pilots are still allowed to operate under VFR within the MOA itself without requiring authority (unless a Restricted Airspace is active). Therefore, there are less than significant impacts to air traffic under the No Action Alternative.

3.9.3.2 Alternative 1

3.9.3.2.1 Land Activities

Under Alternative 1, military readiness activities are not anticipated to generate any trips through the City of Boardman and would not contribute to traffic increases in the area. After personnel mobilize to a staging area at Umatilla, Oregon National Guard personnel would travel west on Interstate 84 to Exit 168. Personnel would travel south on Bombing Range Road approximately 5.5 mi. (8.8 km) to the NWSTF Boardman main entrance. Activities contributing to military transits from Umatilla consist of military personnel traveling to NWSTF Boardman for ground training. The Level of Service at Bombing Range Road has not been estimated in earlier studies; however, Exit 168 is outside Boardman city limits and services a rural area of low density. The heavy haul trucks carrying tanks and Bradley Fighting Vehicles to and from NWSTF Boardman may increase the amount of wear and tear on the Bombing Range Road between Interstate 84 and the entrance to NWSTF Boardman. With an estimated daily load of over 1,000 vehicles on the road, the low number of trips by heavy haul trucks and Bradley Fighting Vehicles are not expected to downgrade the Level of Service; therefore, no significant negative effects would be expected, nor is Bombing Range Road anticipated to be closed. The nominal volume of additional traffic accessing NWSTF Boardman during operation of the proposed training ranges would have no significant impacts on vehicle traffic.

3.9.3.2.2 Air Activities

Under Alternative 1, military air readiness activities would continue to traverse airspace above public and private lands in existing NWSTF Boardman airspace, as well as in the proposed Boardman Low MOA and Boardman MOA (Proposed Extension). The establishment of the new and extended MOAs would (1) accommodate proposed increases in LATT; (2) lower the minimum altitude in a portion of the available airspace (the lower altitude of the current Boardman MOA is 4,000 ft. [1,219.2 m] MSL, the Boardman Low MOA overlay would lower this limit to 500 ft. [152.4 m] AGL); (3) create a new MOA where the NSA was previously located (and is already avoided by aviators); and (4) adjust LATT flight patterns to decrease conflict with wind turbines in R-5701C.

The Boardman Low MOA and Boardman MOA (Proposed Extension) would provide the additional airspace and lower altitudes required for the proposed increase in LATT and potential shift in flight tracks to the northeast (as presented in Chapter 2, Description of Proposed Action and Alternatives). The number of LATT readiness activities would increase from the current level of 257 to 1,047 under Alternative 1 (approximately 2,044 training hours). One reason for this seemingly high number is because more than one aircraft may be in the airspace at one time, hence multiple flight hours would occur during one real hour. Also, for estimation purposes within this Environmental Impact Statement (EIS), sorties that occur for any portion of an hour of flight time are counted as a full hour.

Because the proposed additional airspace would be a MOA, only IFR traffic is separated and limited during military readiness activities, as a MOA does not restrict VFR operations. However, while VFR operations are not restricted, it is not advised to fly in a MOA while the airspace is active, but pilots who still choose to operate under VFR should exercise extreme caution while flying within, near, or below an active MOA. LATT at NWSTF Boardman is restricted to the daylight period, and further restricted to being conducted within the timeframe of 2 hours after sunrise until 2 hours before sunset for safety purposes. This 4-hour daylight buffer would allow general aviators, such as crop dusters, the flexibility to traverse the proposed MOAs outside of LATT flight hours.

Under Alternative 1, all Restricted Areas will remain the same and, as such, all rules and regulations pertaining to Restricted Areas will still be in place. Non-participating aircraft are prohibited to enter Restricted Areas at NWSTF Boardman unless they have prior approval from the controlling authority (Seattle ARTCC). Non-military aviators must coordinate any flight activities that require entrance into the Restricted Area with Seattle ARTCC, who in turn works with local aviators and military training scheduling to determine available flight times.

The proposed additional airspace does not interfere with any commercial air traffic patterns or airports/airstrips since all Victor routes do not conflict with NWSTF Boardman’s airspace, or significantly restrict civilian aviation in the area. There are only three jet routes that cross NWSTF Boardman’s airspace (J16, J54, and Q154); however, J16 and J54 have a minimum IFR en route altitude of 29,000 ft. (8,839.2 m), Q154 has a minimum IFR en route altitude of 24,000 ft. (7,315.2 m), and they would therefore not interfere or have any effect on NWSTF Boardman’s airspace. The availability of airspace can be found in general flight publications, or through NOTAMs if the airspace is active other than what is published in the flight information publication. The Boardman LOW MOA and Boardman MOA (Proposed Extension)would also be activated from 0730 to 2359 Monday through Friday, and at other times by NOTAMs (6 hours advance notice).

It is not anticipated that actions under Alternative 1 would affect local aviation traffic. Local aviators may coordinate activities that require entrance into Restricted Airspace during active hours with ATC, and general flight publications and NOTAMs allow aviators the opportunity to plan around military readiness activities and coordinate flight times with Seattle ARTCC. Local aviators are also allowed to operate under Restricted Areas (Restricted Area R-5706, for instance, has a base altitude of 3,500 ft. [1,066.8 m] AGL). Though LATT would occur within the new Boardman Low MOA and Boardman MOA (Proposed Extension), training hour restrictions allow local aviators to plan their activities outside of the Navy training hours. Further, though the MOA does not require clearance for local aviators to fly through, aviators may still coordinate with Seattle ARTCC if they need to fly during the timeframe of LATT activities. Pilots are still allowed to operate under VFR within the MOA itself without requiring authority (unless a Restricted Airspace is active). Therefore, there are less than significant impacts to air traffic under Alternative 1.

3.9.3.3 Alternative 2

3.9.3.3.1 Land Activities

Alternative 2, the Preferred Alternative, would have similar effects as Alternative 1 on vehicle traffic, although slightly less than under Alternative 1. Since the Digital Multipurpose Training Range is not proposed for construction or operation under Alternative 2, the heavy haul trucks carrying tanks and Bradley Fighting Vehicles to and from NWSTF Boardman would not be used, thereby reducing the level of wear on regional roadways. The nominal volume of additional traffic accessing NWSTF Boardman during operation of the proposed training ranges would have a less than significant impact on vehicle traffic.

3.9.3.3.2 Air Activities

Alternative 2, the Preferred Alternative, would have the same effects as Alternative 1 on air traffic. The proposed additional airspace does not interfere with any commercial air traffic patterns since all surrounding airport's victor routes do not conflict or come into NWSTF Boardman's airspace, or significantly restrict local aviation in the area. Therefore, there are less than significant impacts to air traffic under Alternative 2.

3.9.3.4 Proposed Management Practices, Monitoring and Mitigation Measures

3.9.3.4.1 Proposed Management Practices

No adverse effects to ground or air transportation were identified; therefore, no proposed management practices are warranted. There are measures in place or proposed for other resources (e.g., Noise, Section 3.4, and Wildlife, Section 3.6) that also apply to transportation at NWSTF Boardman, mainly through the stipulation of training parameters.

3.9.3.4.2 Proposed Monitoring

No specific monitoring needs were identified for transportation.

3.9.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for transportation based on the analysis presented in Section 3.9.3 (Environmental Consequences).

3.9.3.5 Summary of Effects and Conclusions

Table 3.9-1 summarizes the effects and mitigation measures for the No Action Alternative, Alternative 1, and Alternative 2. Overall, all alternatives would have a less than significant impact on the vehicle and air traffic in the Study Area, with Alternative 2 being the Preferred Alternative.

Table 3.9-1: Summary of Effects on Vehicle and Air Traffic

Stressor	Summary of Effects and National Environmental Policy Act Determination
No Action Alternative	
Other Stressor Categories	
Land Activities	• Military readiness activities along Bombing Range Road are not estimated to generate any trips through the City of Boardman. Military readiness activities under the No Action Alternative would continue to vary from basic individual to unit level events of relatively short duration involving few participants, and would therefore have a less than significant impact on vehicle traffic.
Air Activities	• The current airspace is capable of handling the current levels of training conducted at NWSTF Boardman and use of the airspace does not interfere with commercial air traffic patterns, or significantly prohibit civilian aviation in the area. • Local aviators may coordinate activities that require entrance into Restricted Airspace during active hours with Seattle ARTCC. General flight publications and NOTAMs allow aviators the opportunity to plan around military readiness activities and coordinate flight times with Seattle ARTCC. Victor routes do not conflict or come into NWSTF Boardman's airspace. Pilots are still allowed to operate under VFR within the MOA itself without requiring authority (unless the MOA overlaps an active Restricted Airspace).
Impact Conclusion	• There are less than significant impacts to vehicle and air traffic under the No Action Alternative.
Alternative 1	
Other Stressor Categories	
Land Activities	• Under Alternative 1, military readiness activities are not estimated to generate any trips through the City of Boardman and would not contribute to traffic increases in the area. No roads would be reclassified below their current A or B rating as a result of implementation of Alternative 1.The nominal volume of additional traffic accessing NWSTF Boardman during operation of the proposed training ranges would have a less than significant impact on vehicle traffic.
Air Activities	• The current Restricted Areas and proposed MOAs and ATCAA on NWSTF Boardman under Alternative 1 do not affect commercial aviation traffic and have minimal effect on general aviation. • Local aviators may coordinate activities that require entrance into Restricted Airspace during active hours with Seattle ARTCC. General flight publications and NOTAMs allow aviators the opportunity to plan around military readiness activities and coordinate flight times with Seattle ARTCC. Victor routes do not conflict or come into NWSTF Boardman's airspace. Pilots are still allowed to operate under VFR within the MOA itself without requiring authority (unless the MOA overlaps an active Restricted Airspace). Though LATT occurs within the new Boardman Low MOA and Boardman MOA (Proposed Extension), training hour restrictions allow local aviators to plan their activities outside of the Navy training hours. Further, though the MOA does not require clearance for local aviators to fly through, aviators may still coordinate with Seattle ARTCC if they need to fly during the timeframe of LATT activities.
Impact Conclusion	• There are less than significant impacts to vehicle and air traffic under Alternative 1.

Table 3.9-1: Summary of Effects on Vehicle and Air Traffic (continued)

Stressor	Summary of Effects and National Environmental Policy Act Determination
Alternative 2	
Other Stressor Category	
Land Activities	• Under Alternative 2, military readiness activities are not estimated to generate any trips through the City of Boardman and would not contribute to traffic increases in the area. Activities contributing to military transits from Umatilla consist of military personnel traveling to NWSTF Boardman for ground training. No roads would be reclassified below their current A or B rating as a result of implementation of Alternative 1. The nominal volume of additional traffic accessing NWSTF Boardman during operation of the proposed training ranges would have a less than significant impact on vehicle traffic.
Air Activities	• The current Restricted Areas and proposed MOAs and ATCAA on NWSTF Boardman under Alternative 2 do not affect commercial aviation traffic and would have minimal effect on general aviation. • Local aviators may coordinate activities that require entrance into Restricted Airspace during active hours with Seattle ARTCC. General flight publications and NOTAMs allow aviators the opportunity to plan around military readiness activities and coordinate flight times with Seattle ARTCC. Victor routes do not conflict or come into NWSTF Boardman's airspace. Pilots are still allowed to operate under VFR within the MOA itself without requiring authority (unless a Restricted Airspace is active). Though LATT occurs within the new Boardman LOW MOA and Boardman MOA (Proposed Extension), training hour restrictions allow local aviators to plan their activities outside of the Navy training hours. Further, though the MOA does not require clearance for local aviators to fly through, aviators may still coordinate with Seattle ARTCC if they need to fly during the timeframe of LATT activities.
Impact Conclusion	• There are less than significant impacts to vehicle and air traffic under Alternative 2.

Notes: ARTCC = Air Route Traffic Control Center, NOTAM = Notice to Airmen, NWSTF = Naval Weapons Systems Training Facility, VFR = Visual Flight Rules, MOA = Military Operations Area, ATCAA = Air Traffic Control Assigned Airspace, LATT = Low-Altitude Tactical Training

3.10 Cultural Resources

3.10.1 Introduction

3.10.1.1 Overview

This section describes existing cultural resources at Naval Weapons Systems Training Facility (NWSTF) Boardman and assesses the possible consequences to these resources by the Proposed Action. A cultural resource is any definite location or object of past human activity, occupation or use, identifiable through inventory, historical documentation, or oral evidence. Cultural resources include buildings, structures, districts, archaeological sites, historic landscapes, traditional cultural properties, and objects of significance in history, architecture, archaeology, engineering, or culture. Cultural resources that are eligible for inclusion in or listed in the National Register of Historic Places (NRHP) are called historic properties. Cultural resources also include associated documents and records. Cultural resources currently identified at NWSTF Boardman consist of archaeological sites, historic trails, historic architectural resources, and American Indian traditional cultural properties. American Indian traditional resources specifically associated with hunting, gathering, and treaty rights are discussed in Section 3.11 (American Indian Traditional Resources).

Archaeological resources include both prehistoric and historic sites. Prehistoric resources are physical properties resulting from human activities that predate written records and are generally identified as archaeological sites. They can include village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Historic archaeological resources postdate the advent of written records in a region, must be at least 50 years old, and can include building foundations, ruins, mines, and refuse scatters.

Historic trails are another type of cultural resource that provides physical evidence of human activity, but may not always be defined as archaeological or architectural. Several segments of the Oregon Trail, a segment of an 1874 wagon road, and a segment of the 1861 Old Emigrant Wagon Road specifically occur within or near NWSTF Boardman.

Architectural resources consist of standing buildings or structures from the historic period. Buildings provide shelter for human activity and may consist of residential buildings (e.g., farmhouses, and associated outbuildings, including sheds and barns), commercial buildings (e.g., stores, banks, and other business-related office buildings), and military buildings, such as administrative buildings, spotting towers, and other ancillary outbuildings. Structures are defined as those that do not provide shelter for human activity and include transportation-related structures, such as roads and bridges or military structures, such as water tanks and bombing targets.

Traditional cultural properties are resources that are associated with the beliefs and cultural practices of a living culture, subculture, or community. The beliefs and practices associated with the traditional cultural property and community must be rooted in the group's history and important to maintaining the group's cultural identity. Traditional cultural properties are not limited to American Indians but can represent any ethnic group with strong ties to the property (National Park Service 1998). Traditional cultural properties that are listed in or eligible for listing in the NRHP are afforded the same protection as other types of historic properties. Resources that are significant to American Indian Tribes and may be considered traditional cultural properties include, but are not limited to prehistoric sites and artifacts, sacred areas, traditional use areas (e.g., native plant gathering areas or wildlife habitat), traditional materials and their sources, and sites for cultural practices. Many resources are also sacred places important to American Indians and may include mountain peaks, springs, and burial sites.

Traditional uses may prescribe the use of particular native plants, animals, or minerals from specific places. Therefore, activities that may affect sacred areas or the availability of materials used in traditional practices may be of concern to American Indians.

3.10.1.2 Regulatory Framework

Archaeological resources, historic trails, architectural resources, and American Indian traditional cultural properties are protected by a variety of laws and their implementing regulations: the National Historic Preservation Act (NHPA) of 1966, as amended (16 United States Code [U.S.C.] 470), the Archeological and Historic Preservation Act of 1974, the Archaeological Resources Protection Act of 1979, the American Indian Religious Freedom Act of 1978, and the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990. The Advisory Council on Historic Preservation (ACHP) further guides treatment of archaeological and architectural resources through the regulations, *Protection of Historic Properties* (36 Code of Federal Regulations [C.F.R.] §800). Historic properties, as defined by the NHPA, represent the subset of cultural resources listed in, or eligible for inclusion in, the NRHP.

Historic properties must be important in American History, have physical integrity, and meet at least one of the NRHP criteria defined at 36 C.F.R. §60.4:

- Criterion A: Be associated with events that have made a significant contribution to the broad patterns of American history
- Criterion B: Be associated with the lives of persons significant in the American past
- Criterion C: Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction
- Criterion D: Yield, or may be likely to yield, information important in prehistory or history

To convey significance and qualify for the NRHP, historic properties also possess several and usually most of the following aspects of integrity: location, design, setting, materials, workmanship, feeling, and association.

Traditional cultural properties are eligible for listing in the NRHP because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining and continuing cultural identity of the community. Traditional cultural properties may be identified by American Indians or other living communities. Even if resources that are significant to American Indian Tribes may not be considered traditional cultural properties, these resources may be afforded protection by other laws, regulations, or executive orders.

Secretary of the Navy Instruction (SECNAVINST) 5090.8a, *Policy for Environmental Protection, Natural Resources and Cultural Resources Programs*, and Chief of Naval Operations Instruction (OPNAVINST) 5090.1c, Chapter 27, *Cultural Resources Management*, require the Navy to consider the effects of its undertakings on cultural resources in its planning and program efforts. SECNAVINST 4000.35a, *Department of the Navy Cultural Resources Program*, establishes policy and assigns responsibilities within the United States (U.S.) Department of the Navy (Navy) for fulfilling the requirements of cultural resources laws such as NHPA.

Under the implementing regulations of Section 106 of the NHPA, federal agencies must take into account the effects that an action would have on historic properties. The regulations implementing Section 106 (36 C.F.R. §800) specify a consultation process to assist in satisfying this requirement.

Initiated in April 2011, the Navy completed consultation with the Oregon State Historic Preservation Office (SHPO), the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, the Nez Perce, the Oregon-California Trails Association, the Oregon Historic Trails Advisory Council, and the National Park Service for the Proposed Action in accordance with the implementing regulations of Section 106 of the NHPA of 1966 as amended (16 U.S.C. 470) (Appendix C).

Under the National Environmental Policy Act (NEPA), an Environmental Impact Statement (EIS) must address the adverse and beneficial effects of a proposed federal action on important historic and cultural aspects of our national heritage (40 C.F.R. §1508.8) (here defined as resources eligible for or listed in the NRHP, and other designations such as the National Trails System). While NEPA and Section 106 of the NHPA represent two separate procedural laws, the public participation for the Proposed Action has been integrated to the extent possible. The NEPA scoping and Draft EIS public review processes (see Section 1.4.1, the National Environmental Policy Act) provided opportunities for the public to participate not only in the NEPA process, but to contribute to public involvement in accordance with Section 106 of the NHPA.

Section 4(f) of the Department of Transportation Act, which is codified and renumbered in section 303(c) of 49 U.S.C., provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from an historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such program and the project includes all possible planning to minimize harm resulting from the use.

However, designation of airspace for military flight operations is exempt from section 4(f). The National Defense Authorization Act for Fiscal Year 1998 (Public Law 105-85) provided that “[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of section 303(c) of title 49, U.S.C.”

3.10.1.3 Determination of Significance

Under Section 106, an undertaking (i.e., the proposed action under NEPA) is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify it for inclusion in the NRHP. An effect is considered adverse when it diminishes the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association (36 C.F.R. §800.5(a)(1)).

Adverse effects as defined under 36 C.F.R. §800.5(a)(2)(i) through (vii) include, but are not limited to:

1) Physical destruction, damage, or alteration of all or part of the property
2) Isolation of the property from or alteration of the character of the property’s setting when that character contributes to the property’s qualification for the NRHP
3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting
4) Neglect of a property resulting in its deterioration or destruction
5) Transfer, lease, or sale of the property

Adverse effects under the NHPA also include reasonably foreseeable effects, both direct and indirect, caused by the alternatives, and those that could occur later in time, be farther removed in distance, or be cumulative (36 C.F.R. §800.5(a)(1)). Because cultural resources are typically nonrenewable, most adverse effects on NRHP-listed or -eligible resources in the area of potential effects (APE) would be irrevocable.

Under NEPA, impacts on cultural resources and the subgroup of historic properties are explicitly identified as attributes that must be addressed to determine the significance of a project's anticipated environmental impacts. The potential for adverse effects on cultural resources is considered in this NEPA assessment. An adverse effect on a historic property, however, does not necessarily equate to a significant impact under NEPA. Under NEPA, a significant impact can be mitigated to less than significant through completion of the Section 106 process resulting in development of an agreement document resolving the adverse effects through a form of mitigation, which could include data recovery or other treatment measures. For the purposes of this document, a significant impact under NEPA is defined as an "unresolvable" adverse effect under Section 106 of the NHPA.

3.10.2 Affected Environment

3.10.2.1 Cultural Context

The following summary of the prehistoric period is derived or excerpted from information in Archaeological Research at the Proposed Multipurpose Machine Gun (MPMG) and Multipurpose Training (MPTR) Ranges, United States Naval Weapons System Training Facility, Boardman, Morrow County, Oregon (Oregon National Guard 2005b).

The APEs are included in the Southern Plateau subdivision of the Columbia Plateau, as that region is often defined by archaeologists. The APEs are located in the southwest sub-section of the Southern Plateau. The earliest evidence of human use of the Southwest Plateau is designated Period IB (circa 11,000 to 7,000/6,400 years before present [BP]) and includes post-Clovis hunter-gatherer cultures that possessed a broad-spectrum subsistence economy, using many different food resources rather than focusing on a specific resource. Households were mobile and moved frequently throughout the year to acquire various foodstuffs as they became available. Population density was relatively low. The Period IB toolkit featured a well-developed bone and antler tool industry, bolas, burins, large unstemmed or constricted stem projectile points (Cascade and Windust points, respectively), milling implements, knives, drills, gravers, and edge-ground cobbles. Fish remains from sites dating to this period located along the Columbia River suggest the early use of salmonid resources (Oregon National Guard 2005b).

Period II (circa 7,000/6,400 to 3,900 years BP) in the Southwest Plateau is considered a time of transition in stylistic elements between the earlier Period IB and the subsequent Period IIIA. It is thought that the subsistence regime must have been continued from Period IB, with ephemeral, short-term habitation (Oregon National Guard 2005b).

Pit houses became widespread during Period IIIA (circa 3,000–1,000 years BP) and the use of salmon and camas intensified. Storage techniques were devised to preserve these foods for the winter months, and land use shifted to seasonally occupied villages in canyons and river valleys. Special-use camps were visited in the upland areas at specific times to harvest food resources as they became available. With these developments, a vigorous trade in non-local goods evolved. Salmon are the dominant species in archaeological faunal assemblages from this period, but large mammals are also well represented (Oregon National Guard 2005b). During Period IIIB (circa 1,000 years BP to Contact), the winter village pattern described ethnographically was firmly in place throughout the region. Specialized activities are inferred from artifact assemblages that typically contain large cobble choppers, flake and bifacial knife tools, formed scrapers, hammerstones, hopper mortar bases, and bone implements. Small basal-notched, barbed, stemmed, and side-notched points (such as the ubiquitous Plateau side-notched point found throughout the Plateau culture region) reflect the adoption of the bow and arrow. Trade goods such as olivella and dentalia shell, steatite and soapstone pendants and pipes, and incised-bone beads are not uncommon at sites dating to this sub-period (Oregon National Guard 2005b).

Many American Indian groups occupied, hunted and gathered, or traveled through the current boundaries of NWSTF Boardman. Today, they are represented by the CTUIR, the Confederated Tribes of the Warm Springs of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe (Stern 1998, U.S. Army 2002). The CTUIR includes Cayuse, Umatilla, and Walla Walla peoples (Stern 1998). The Confederated Tribes of Warm Springs consists of three tribal groups: the Warm Springs, the Wasco, and the Northern Paiutes (Hunn and French 1998). The Confederated Tribes and Bands of the Yakama Nation comprise 14 tribes and bands: Palouse, Pisquose, Yakama, Wenatchapam, Klinquit, Oche Chotes, Kow way saye ee, Sk'in-pah, Kah-miltpah, Klickitat, Wish ham, See ap Cat, Li ay was, and Shyiks (Yakama Nation Museum 2010). The Nez Perce Tribe is closely related to the Sahaptin speakers of Oregon and Washington including the Palouse, Walla Walla, Yakima, Umatilla, and Wayampam (Walker 1998).

The following summary of the historic period is based on information provided in *Inventory and Evaluation of Naval Weapons Systems Training Facility Boardman, Boardman, Morrow County, Oregon* (U.S. Department of the Navy 2009) and *Archaeological Research at the Proposed MPMG and MPTR Ranges, United States Naval Weapons System Training Facility, Boardman, Morrow County, Oregon* (Oregon National Guard 2005b). In October 1805, Lewis and Clark journeyed down the Columbia River and set foot near modern-day Boardman, Oregon, initiating Euroamerican arrival in the region. Shortly thereafter, fur trappers, Catholic and Protestant missionaries, and exploratory and military parties crisscrossed the area in various pursuits. The area remained sparsely populated by Euroamericans until the Oregon Trail was developed circa 1841, passing through the Columbia River Valley and later in what is now Morrow County (created from the western part of what was Umatilla County), becoming part of the route used by early settlers (U.S. Department of the Navy 2009).

Travelers entered the county from the east by crossing Butter Creek, relying on Well Springs (historically known at Upper Well Springs), a stopping point along the trail that was in use by circa 1844 (Hicks 1995). The spring, located in Well Springs Canyon, was known as a consistent source of water along what was otherwise an arid desert environment, enabling travel on this part of the route. Well Springs and the main section of the Oregon Trail crossed the southern part of the NWSTF Boardman Range. Another diversion in the Oregon Trail went to Tub Springs (historically known as Lower Well Springs), located in Juniper Canyon on the southern part of the NWSTF Boardman. Both springs continued to be used until overland travel on the Oregon Trail ceased in the 1860s (Oregon National Guard 2005b). In addition to the Oregon Trail, several other historical roads or trails appear to have crossed the NWSTF Boardman between circa 1859 and 1908 (Oregon National Guard 2005b).

As more settlers came to the region, they founded new towns and settlements. With its population increasing, Oregon achieved statehood in 1859. However, while small numbers of cattle were grazing in Morrow County as early as the 1860s, real settlement did not occur here until the 1870s. Livestock-raising was the primary economic force in the county during the early years. Increased settlement, enclosure of free grazing land, and diminished pastures due to overgrazing virtually eliminated the native grasses and resulted in a decline in ranching activities (Oregon National Guard 2005b).

With the decline in ranching activities due to loss of grazing habitat, farming and other agricultural pursuits became the dominant economic force in the county. The West Extension Irrigation District, formed in 1917, brought Umatilla irrigation water by canal to the Boardman area, and additional homesteaders flocked to the land. Unlike soils elsewhere in the irrigation district, alluvial silts occurring near Boardman became productive with irrigation. Completion of rail lines into the county in 1883, as well as overland and water transportation routes, allowed access, promoted shipment of products to distant markets, and encouraged wheat production. As more irrigation projects were developed, other crops came into heavy production, including potatoes, sweet corn, and alfalfa (Oregon National Guard 2005b).

Over the last 60 years, various branches of the U.S. Military have actively influenced the pattern and pace of development in Morrow County. In 1940, the U.S. Army selected 16,000 acres (ac.) (6,475 hectares [ha]) of sage-covered land for the construction of an munitions storage, maintenance, and shipping and receiving facility. By October 1941, the Umatilla Army Ordnance Depot, located about 12 miles (mi.) (19.3 kilometers [km]) northeast of NWSTF Boardman, had been completed and was ready to receive its first shipment of munitions. Six weeks later, after the attack on Pearl Harbor, workers at the facility went on round-the-clock shifts to support the World War II effort. Even through recent years, the arsenal has continued to play an integral role in the nation’s defense (Oregon National Guard 2005b).

When the United States entered World War II after the December 1941 attack on Pearl Harbor, the federal government rushed to develop America’s military capabilities. To expand the country’s air power, the government built not only airfields but also target ranges that allowed pilots to train and practice aerial bombing (U.S. Department of the Navy 2009). Beginning in 1941, the U.S. Army Air Corps began acquiring approximately 96,000 ac. (38, 849.8 ha) in Morrow County (later authorized by a 1943 Act of Congress) at what is now the NWSTF Boardman through purchase of private land and transfer of Department of Interior Bureau of Land Management land. The facility was originally named Arlington Bombing Range, but its name later became associated with the town of Boardman. From 1943 to 1945, the U.S. Army Air Corps used the Boardman Bombing Range for precision aerial bombing practice. Aircraft stationed at Walla Walla Army Air Base initially used the 12-square-mile range for air-to-ground gunnery practice. At the same time, the nearby Umatilla Army Ordnance Depot used the range for the demolition of munitions and small arms trace testing (U.S. Department of the Navy 2009).

After World War II, the range was designated as surplus, and livestock grazing was authorized for a short period. The Boardman Bombing Range became an U.S. Air Force facility and was removed from surplus land rolls in 1948 for use as the Boardman Precision Bombing Range. Boardman Bombing Range was managed from 1952 to 1957 by the 57th Air Division, headquartered at Fairchild Air Force Base, near Spokane, Washington. Navy aircraft first used the range for bombing practice in 1956. Management of the range as an active bombing practice facility by the 57th Air Division ended in 1957, and the U.S. Air Force declared the Boardman Bombing Range as excess land in 1958. The Navy expressed interest in the range, and acquired the Boardman Bombing Range (U.S. Department of the Navy 2009).

Once the Boardman Bombing Range was transferred to the Navy in 1959, the issue of the range’s value as agricultural land re-emerged. Congress requested that the Navy investigate relocating the range once the John Day Dam was completed, a condition similar to that imposed on the U.S. Army in 1943.

Following several years of discussion between the Department of the Interior, the Navy, and the State of Oregon, in 1963, the Navy and the State of Oregon reached a compromise for the division of land. The western 48,568 ac. (19,564.8 ha) of the range were deeded to the state, with the proviso that low-flying aircraft would continue to be allowed to pass over. The western half of the former range ultimately became jointly owned and used by the State of Oregon, Portland General Electric, and Morrow County. The Navy retained the property's eastern half and consolidated the bombing range on 47,432 ac. (19,195 ha) of land, roughly 6 mi. (9.7 km) wide by 12 mi. (19.3 km) long, for use by high-speed jets and high-altitude bomb delivery practice.

3.10.2.2 Area of Potential Effects

As defined by 36 C.F.R. 800.16(d) of Section 106 of the NHPA, the APE represents "…the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking." Two APEs have been identified based on activities associated with the Proposed Action (e.g., ground disturbance, noise, and visual intrusions) and the types of resources that could be affected by these activities:

- The direct APE for ground-disturbing activities, as defined in accordance with 36 C.F.R. §800.16(d), consists of about 1,927 ac. (780.01 ha) at NWSTF Boardman (Figure 3.10-1). This direct APE includes archaeological resources, historic trails, architectural resources, and American Indian traditional cultural properties that could be impacted by ground disturbances that would occur under Alternatives 1 and 2.
- The indirect APE for activities that could generate noise, vibration, and visual intrusions consists of areas that lie beneath Restricted Areas 5701A-E and the proposed Boardman Low Military Operations Area (MOA) (Figure 3.10-2). These areas represent special use airspace where low-altitude (less than 3,000 feet [ft.] [914.4 meters {m}] above ground level) aircraft overflights may occur under the No Action Alternative (except the proposed Boardman Low MOA), and Alternatives 1 and 2. Noise associated with weapons firing on the proposed ranges would also be audible in some areas that occur beneath Restricted Area 5701, specifically within portions of Restricted Area 5701A (see Figure 2-5). The indirect APE for noise and visual intrusions includes archaeological sites, historic trails, architectural resources, and American Indian traditional cultural properties in which historic setting may be critical to their eligibility for the NRHP (e.g., the Well Spring Segment of the Oregon Trail). For this undertaking, vibration intrusions apply to historic architectural resources, which could be affected by vibration from aircraft overflights.

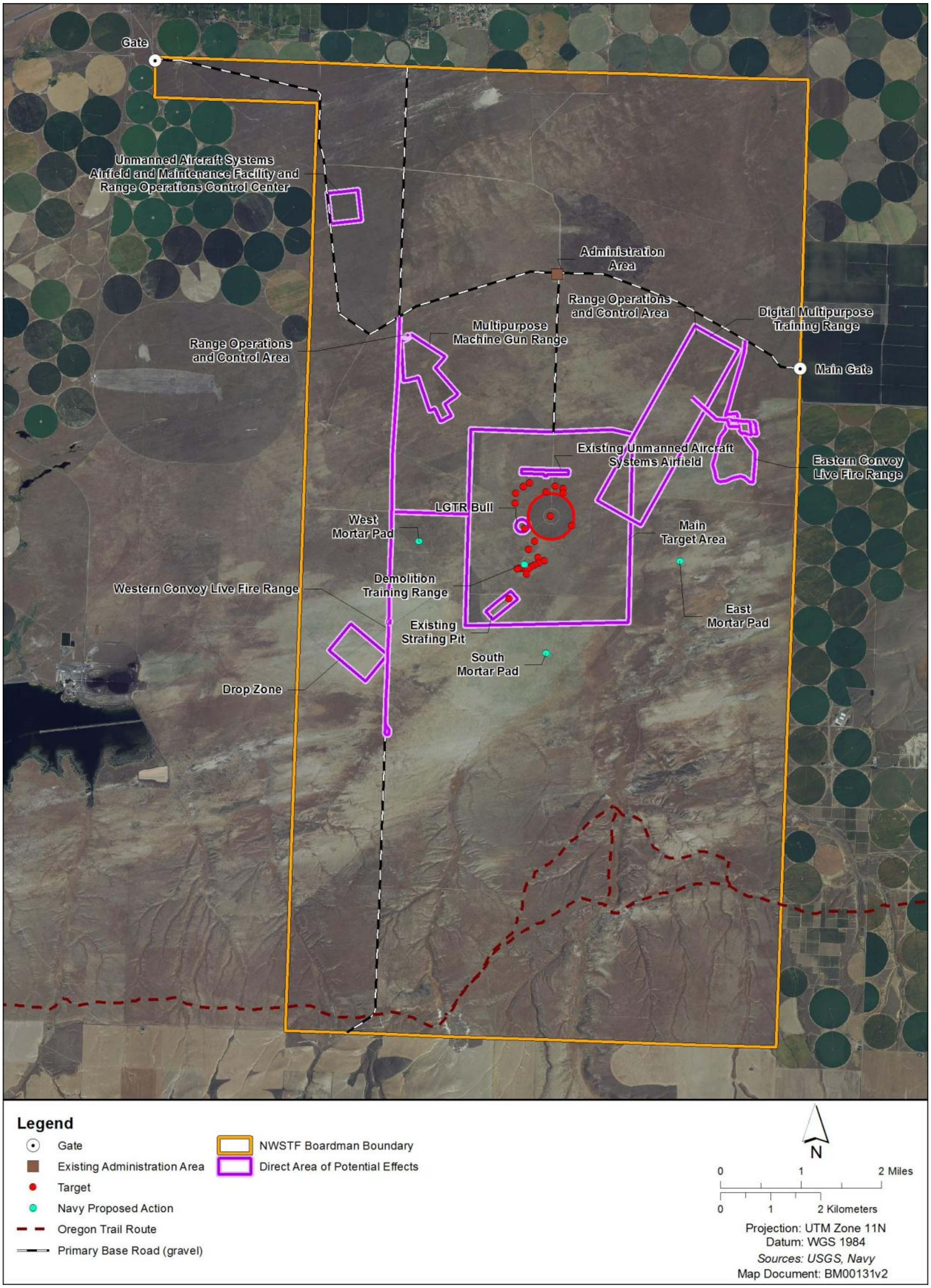
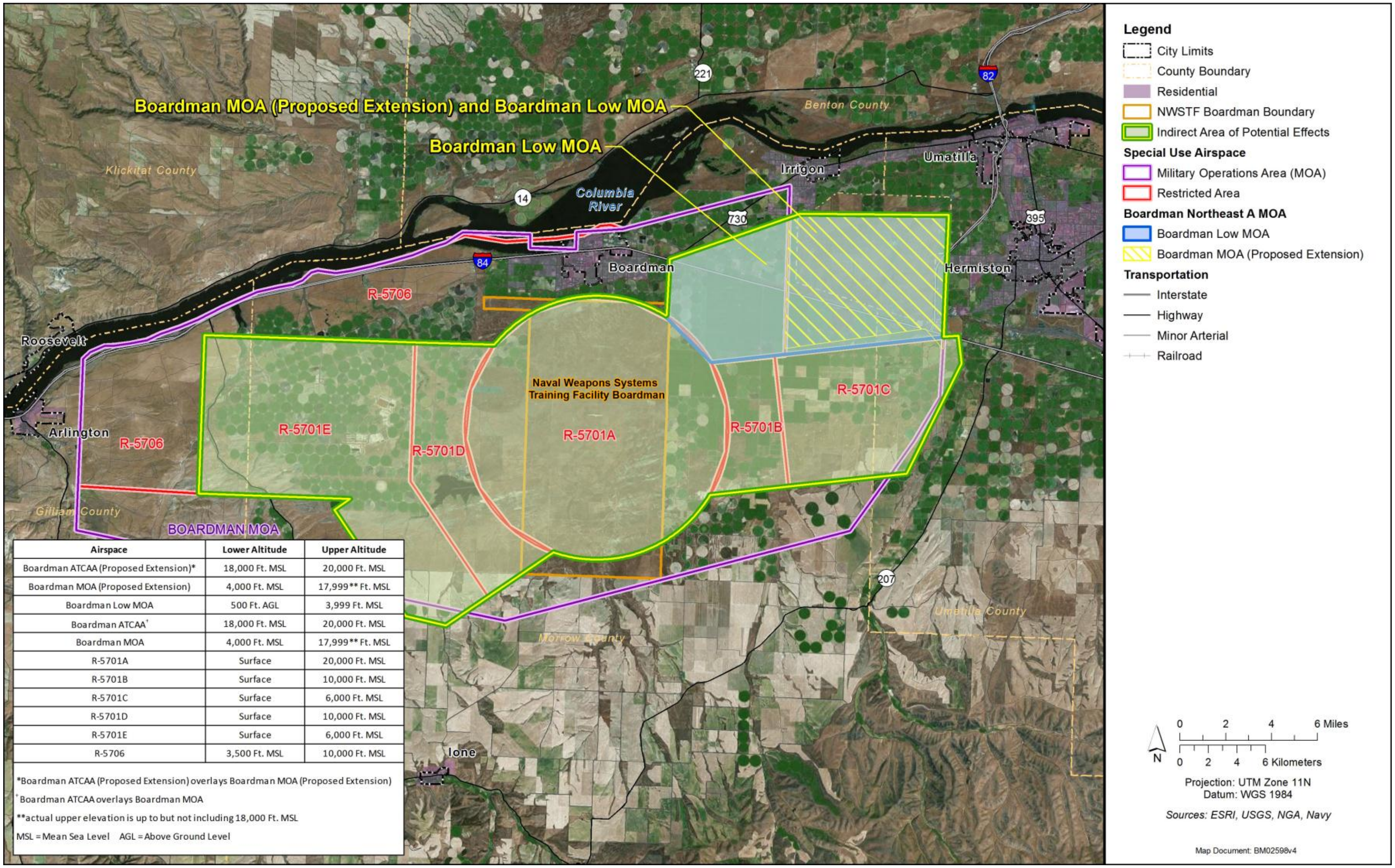


Figure 3.10-1: Direct Area of Potential Effects, Naval Weapons Systems Training Facility Boardman



Airspace	Lower Altitude	Upper Altitude
Boardman ATCAA (Proposed Extension)*	18,000 Ft. MSL	20,000 Ft. MSL
Boardman MOA (Proposed Extension)	4,000 Ft. MSL	17,999** Ft. MSL
Boardman Low MOA	500 Ft. AGL	3,999 Ft. MSL
Boardman ATCAA†	18,000 Ft. MSL	20,000 Ft. MSL
Boardman MOA	4,000 Ft. MSL	17,999** Ft. MSL
R-5701A	Surface	20,000 Ft. MSL
R-5701B	Surface	10,000 Ft. MSL
R-5701C	Surface	6,000 Ft. MSL
R-5701D	Surface	10,000 Ft. MSL
R-5701E	Surface	6,000 Ft. MSL
R-5706	3,500 Ft. MSL	10,000 Ft. MSL

*Boardman ATCAA (Proposed Extension) overlays Boardman MOA (Proposed Extension)
† Boardman ATCAA overlays Boardman MOA
**actual upper elevation is up to but not including 18,000 Ft. MSL
MSL = Mean Sea Level AGL = Above Ground Level

Figure 3.10-2: Indirect Area of Potential Effects, Naval Weapons Systems Training Facility Boardman

3.10.2.3 Archaeological Resources

Ten archaeological investigations have been conducted within the current boundaries of NWSTF Boardman, covering about 40 percent (or approximately 18,973 ac. [7,678.1 ha] of 47,432 ac. [19,195.1 ha]) of this property; however, not all of the surveys meet current standards. Approximately 17,075 ac. (6,910 ha), or 36 percent, of the range have been surveyed to current professional standards. Four archaeological investigations have been conducted in the direct APE (U.S. Air Force 1992, Oregon National Guard 2005a, Oregon National Guard 2005b, and U.S. Department of the Navy and Oregon National Guard 2011) and are summarized below. The remaining surveys were outside the direct APE and are summarized in the 2015 *NWSTF Boardman Integrated Cultural Resources Management Plan (ICRMP)* (U.S. Department of the Navy 2015). The technical reports for the 2014 and 2015 cultural resources surveys are still in preparation. The four surveys summarized below represent complete survey coverage of the direct APE (Figure 3.10-3):

- In 1992, Dr. Maynard Cliff of Geo-Marine (U.S. Air Force 1992) conducted an archaeological survey of 126 ac. (51 ha) for a proposed strafing pit located within the main target area. The pedestrian transects were spaced at 65.6 ft. (20 m) intervals and no cultural resources were observed (U.S. Air Force 1992). In a letter dated July 27, 1992, the Oregon SHPO concurred that no historic properties would be affected by establishing and using the strafing pit.
- In October 2004, Applied Archaeological Research conducted a reconnaissance-level survey of approximately 2,240 ac. (9,006.5 ha) for two parcels of land proposed by the Oregon National Guard (ORNG) for development of a MPTR and a multipurpose machine gun range (MPMGR) (Oregon National Guard 2005b). The fieldwork resulted in the identification of three archaeological sites (35MW197, 35MW198, and 35MW199) and eight archaeological isolates. In Oregon, an archaeological isolate or isolated find is defined as nine or less artifacts without an associated site or feature to provide important information about some past human activity (Oregon State Historic Preservation Office 2011). None of the sites (three) or isolates (eight) identified in the study were considered eligible for the NRHP. The Oregon SHPO concurred with these findings on March 21, 2005 (De Freitas 2005).
- In May 2005, an archaeological survey was conducted by the ORNG for two proposed convoy live-fire ranges (CLFRs), situated along existing unimproved roads (Oregon National Guard 2005a). Pedestrian survey consisted of 20 m (65.6 ft.) transect intervals extending 150 m (492.1 ft.) from the existing roads; no cultural resources were identified. The Oregon SHPO concurred with the report results on July 14, 2005 (Griffin 2005).
- In March 2011, Applied Archaeological Research conducted a reconnaissance-level survey of approximately 1,700 ac. (687 ha) for land proposed for additional development of training ranges (U.S. Department of the Navy and Oregon National Guard 2011). The fieldwork resulted in the identification of three historic archaeological sites (35MW215, 35MW216, and 35MW217), three historic archaeological isolates, and four high probability areas with the potential to contain subsurface archaeological deposits (settings as defined by Dames and Moore 1993). Subsurface excavation of 40 small test units was subsequently conducted to determine the vertical and horizontal extent of any intact deposits; an additional historic isolate was recorded during testing (U.S. Department of the Navy and Oregon National Guard 2011). No surface or subsurface archaeological artifacts were recovered from the four high probability areas (U.S. Department of the Navy and Oregon National Guard 2011). None of the 3 sites or the 12 isolates contained subsurface deposits. The new sites were recommended as not eligible for the NRHP. The Oregon SHPO concurred with these findings on December 21, 2012.

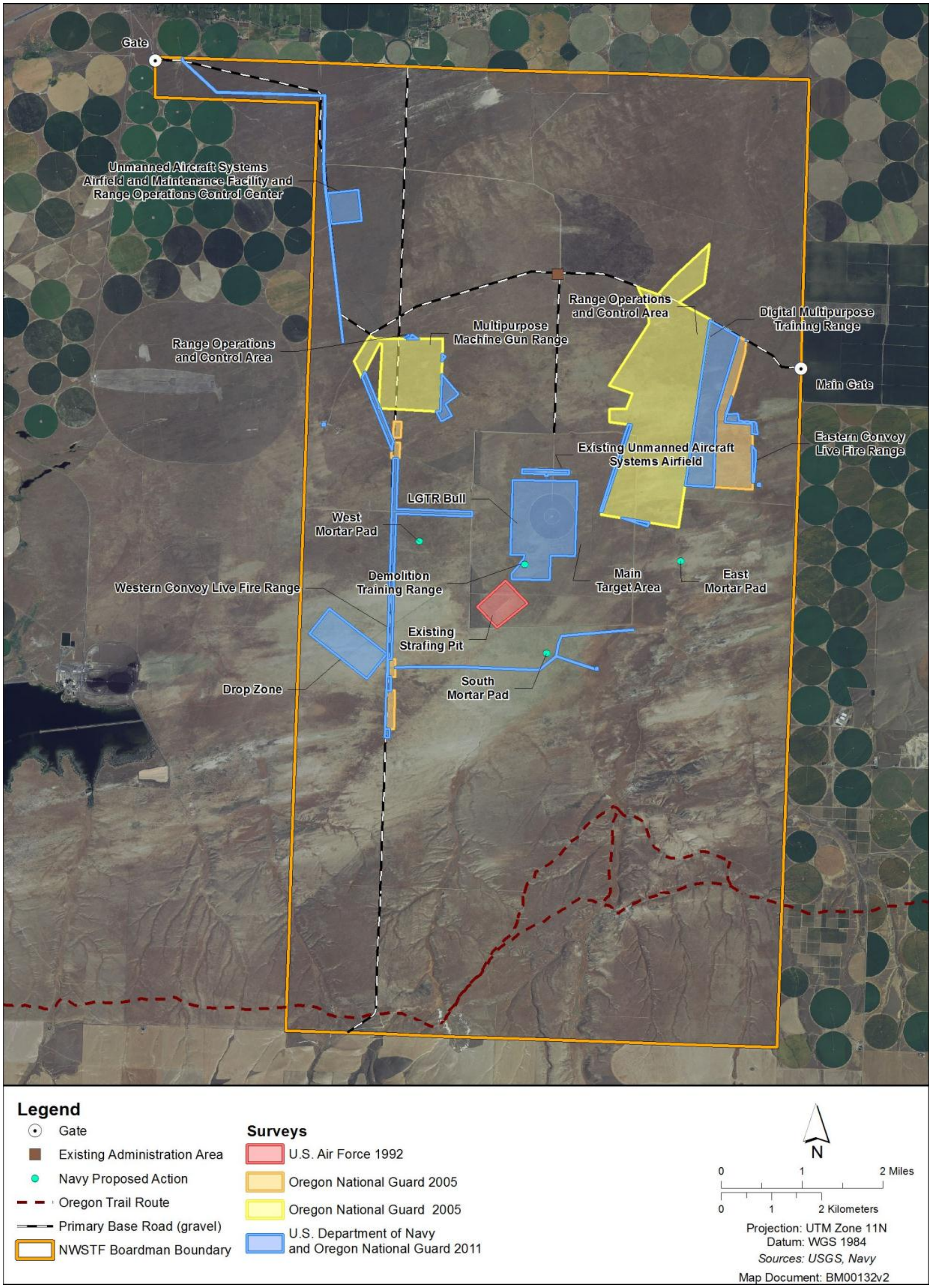


Figure 3.10-3: Archaeological Investigations in the Direct Area of Potential Effects, Naval Weapons Systems Training Facility Boardman

3.10.2.3.1 Archaeological Sites and Isolates

Six archaeological sites and 12 isolates (defined as nine artifacts or less) have been identified in the direct APE (Table 3.10-1). Archaeological isolates are not eligible for inclusion in the NRHP and additional work is not required for these isolated artifacts. Sites 35MW197 and 35MW198 are both historic refuse scatters containing tin cans, glass bottle or jar fragments and miscellaneous metal items, dating circa 1947 (Oregon National Guard 2005b). Site 35MW199 is the location of a former steel observation tower (removed in the 1970s), a modern rock and charcoal concentration, and two refuse scatters most likely related to the military occupation (Oregon National Guard 2005b). None of these sites were recommended as eligible for the NRHP by the Navy; the Oregon SHPO concurred with these findings on March 21, 2005 (De Freitas 2005).

Sites 35MW215 and 35MW216 are also historic refuse scatters containing mostly tin cans and bottle glass dating to the early and mid-twentieth century (U.S. Department of the Navy and Oregon National Guard 2011). These scatters are located in the area proposed for the western CLFR. Site 35MW217 consists of a standpipe in a 3 ft. (0.9 m) diameter circular depression associated with domestic refuse such as tin cans, bottle glass, and ceramic vessel fragments dating from the late nineteenth to early twentieth century (U.S. Department of the Navy and Oregon National Guard 2011). As all three sites contained artifacts partially embedded in the soil, subsurface investigations at sites 35MW215, 35MW216, and 35MW217 were conducted in May 2011 to determine the extent of buried deposits (U.S. Department of the Navy and Oregon National Guard 2011); none of the three sites contained subsurface deposits and were recommended as not eligible for the NRHP by the Navy. The Oregon SHPO concurred with these findings on December 21, 2012.

3.10.2.4 Historic Trails

The Well Spring Segment of the Oregon Trail and Lower Well Spring Diversion of the Well Spring Segment are located within the indirect APE (see Figure 3.10-2). The Well Spring Segment of the Oregon Trail (1841–1846) encompasses multiple wagon ruts; the Harbke Homestead (1906–1934) (originally interpreted as a possible stage coach station by U.S. Department of the Navy 1976); the Emigrant Cemetery; and the water source, Well Springs (U.S. Department of the Navy 1997). The Well Spring Segment of the Oregon Trail consists of 7 mi. (11.3 km) of visible continuous deep and parallel wagon ruts and Well Springs, which was an important Oregon Trail water source (Hicks 1995). The Well Spring Segment of the Oregon Trail is listed in the NRHP under Criterion A for serving as an avenue through which immigration to the Pacific Northwest occurred and securing the United States' territorial rights to that area later to become the Oregon Territory (Hicks 1995). The Lower Well Springs Diversion of the Well Spring Segment of the Oregon Trail consists of a nearly continuous alignment of single wagon ruts from the Oregon Trail to Tub Springs, intersections with the main route of the Oregon Trail, multiple wagon ruts west of Tub Springs, and the Tub Springs water source (U.S. Department of the Navy 1997). The Lower Well Springs Diversion of the Well Spring Segment of the Oregon Trail is treated as eligible for the NRHP under Criterion A because of its association with the Oregon Trail and the westward migration to the Willamette Valley in 1851–1863 (U.S. Department of the Navy 1997), though this eligibility determination has never been formalized with the Oregon SHPO.

Table 3.10-1: Archaeological Sites and Isolates within the Direct Area of Potential Effects, Naval Weapons Systems Training Facility Boardman

Resource Number	Resource Type	Description	NRHP Status	Reference
35MW197	Historic site	Domestic refuse scatter; circa 1947	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
35MW198	Historic site	Domestic refuse scatter; circa 1947	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
35MW199	Historic/ Modern site	Two features and two refuse scatters: feature 1 consists of four concrete footings for steel observation tower, feature 2 is a rock and charcoal concentration (modern); refuse scatters contain glass bottle fragments, cans, and military ordnance debris; circa 1950s/1960s	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
35MW215	Historic site	Domestic refuse scatter; circa early twentieth century	Not eligible, Oregon SHPO concurrence 2012	U.S. Department of the Navy and Oregon National Guard 2011
35MW216	Historic site	Domestic refuse scatter; circa 1937	Not eligible, Oregon SHPO concurrence 2012	U.S. Department of the Navy and Oregon National Guard 2011
35MW217	Historic site	One feature and one refuse scatter: feature is a 6-inch-diameter metal pipe in a 3-foot-diameter depression (possible well); refuse scatter contains cans, window glass, bottle glass, and ceramic fragments; circa late nineteenth to early twentieth century	Not eligible, Oregon SHPO concurrence 2012	U.S. Department of the Navy and Oregon National Guard 2011
AAR1	Historic isolate	Short-necked amber glass beer bottle circa 1951	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
AAR2	Prehistoric isolate	Chert core	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
AAR3	Prehistoric isolate	Basalt flake	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
AAR4	Historic isolate	Clear glass insulator (Hemingray) fragment and weathered wood support	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
AAR5	Historic isolate	Tin can scatter of four items; circa 1940s/1950s	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b

Table 3.10-1: Archaeological Sites and Isolates within the Area of Potential Effects for Ground-Disturbing Activities, Naval Weapons Systems Training Facility Boardman (continued)

Resource Number	Resource Type	Description	NRHP Status	Reference
AAR6	Historic isolate	Short-necked amber glass beer bottle; circa 1947	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
AAR7	Historic isolate	Short-necked amber glass beer bottle; circa 1949	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
AAR8	Prehistoric isolate	Tested quartzite cobble	Not eligible, Oregon SHPO concurrence 2005	Oregon National Guard 2005b
AAR 1028-4i	Historic isolate	Sanitary tin can	Not eligible, Oregon SHPO concurrence 2012	U.S. Department of the Navy and Oregon National Guard 2011
AAR 1028-5i	Historic isolate	Two hole-in-top tin cans	Not eligible, Oregon SHPO concurrence 2012	U.S. Department of the Navy and Oregon National Guard 2011
AAR 1028-6i	Historic isolate	Tin can and metal scatter of eight items	Not eligible, Oregon SHPO concurrence 2012	U.S. Department of the Navy and Oregon National Guard 2011
AAR 1028-7i	Historic isolate	Amber glass bottle	Not eligible, Oregon SHPO concurrence 2012	U.S. Department of the Navy and Oregon National Guard

Notes: NRHP = National Register of Historic Places, SHPO = State Historic Preservation Office

The existing setting of the Oregon Trail on NWSTF Boardman is a rural agricultural area with vast open spaces. This setting was essentially the same when the Well Spring Segment of the Oregon Trail and Lower Well Spring Diversion of the Well Spring Segment were evaluated as eligible for the NRHP in the 1990s. At that time, temporary noise and visual intrusions to the setting included military readiness activities and agricultural operations. Minor visual intrusions, consisting of Immigrant Lane (a section line road) and fencing on the southern edge of NWSTF Boardman were also present at that time. The setting has not changed appreciably since the 1990s. Therefore, past and current activities do not diminish the integrity of setting, feeling, and association, or these segments of the Oregon Trail would have been determined not eligible.

As discussed in Sections 3.7 (Land Use and Recreation) and 3.12 (Public Health and Safety and Protection of Children), public access to NWSTF Boardman is limited to ensure safety. However, the Navy in cooperation with the National Park Service has established an interpretive area at the extreme southern end of NWSTF Boardman, which allows the public to safely access the Emigrant Cemetery, Well Springs, and a small portion of the Well Spring Segment of the Oregon Trail. Access to other portions of the Oregon Trail is restricted by fencing and signage.

Two segments of wagon roads have also been identified approximately 12 mi. to the northeast within the indirect APE and beneath the proposed Boardman Low MOA, but outside the boundary of NWSTF Boardman (U.S. Army 2002). A 6,000 ft. (1,828.8 m) segment of an 1874 wagon road and a 1,200 ft.

(365.8 m) segment of the 1861 Old Emigrant Wagon Road were documented; both wagon roads have been previously disturbed. These segments of the two wagon roads have not been evaluated for eligibility for listing in the NRHP (U.S. Army 2002).

No other known wagon road segments have been identified within the indirect APE. Most of the remaining area beneath the existing and proposed special use airspace is agricultural land (see Section 3.7, Land Use and Recreation) on which agricultural activities have likely disturbed or destroyed any original wagon road segments.

3.10.2.5 Architectural Resources

An architectural resources inventory and evaluation conducted at NWSTF Boardman by Hardlines Design Company included surveying 15 buildings and structures (U.S. Department of the Navy 2009). These facilities consisted mainly of range buildings and small structures such as spotting towers and fuel tanks, plus the aircraft bombing target range itself. One building was constructed in 1943, and the rest of the surveyed properties were built from 1947 to 1989. Preliminary evaluations to determine NRHP eligibility under Criteria A, B, C, D, and application of Criteria Consideration G (for resources achieving significance within the last 50 years) were prepared (U.S. Department of the Navy 2009). The Oregon SHPO concurred with the findings that none of the architectural buildings or structures are eligible for listing in the NRHP in a letter dated May 4, 2010 (Osborne 2010). Seven buildings (Buildings 30–35 and 37) were demolished in May 2009; only the five spotting towers (Buildings 2 and 5–8) remain.

Three 1952 U.S. Air Force target ranges and two additional unknown target ranges also have been identified on NWSTF Boardman based on historical maps (U.S. Department of the Navy 2009). Based on current aerial photographs, no associated structures or spotting towers remain for any of these ranges and original targets and munitions fragments have been removed. These ranges are no longer intact and lack physical integrity.

Two World War II era buildings have also been identified within the indirect APE (Figure 3.10-2) beneath the proposed special use airspace (Boardman Low MOA) in the southern portion of the Umatilla Chemical Depot. The headquarters building (Building 1) and the firehouse (Building 2) are two-story structures with tan brick laid in 5/1 common bond and red clay tile hip roofs, constructed in 1941. The entrance bays are flanked by projecting brick piers with stone caps and brick pilasters that support elaborate brick and stone entablatures (Building Technology, Inc. 1984). Both buildings are located on the main entrance road; the headquarters building faces a landscaped U-shaped parade ground. The firehouse (Building 2) has a one-story garage on the south side. Both buildings are considered eligible for inclusion in the NRHP by the Oregon SHPO (U.S. Army 2002).

No other architectural resources eligible for the NRHP are known to exist within the indirect APE. Most of the area within the indirect APE is agricultural land and small farms (see Section 3.7, Land Use and Recreation) with limited architectural resources (farmhouses and outbuildings). The only architectural resources listed in the NRHP in Morrow County are located in the town of Heppner: the Morrow County Courthouse, the Heppner Hotel, and the Gilliam and Bisbee Building (Oregon Parks and Recreation Department, Heritage Programs 2011); however, Heppner is not located within the indirect APE.

3.10.2.6 American Indian Traditional Cultural Properties

Specific resources associated with American Indian Tribes may include hunting camps and blinds, drive lines and kill sites for deer or antelope, ceremonial locations, vision quest locations, pictographs/petroglyphs, sweat lodges/sweathouses, burial grounds and cremation circles, burial sites associated with the Shoshone/Bannock Indian Wars, and traditional use areas for collection of medicinal plants and herbs (Hunn and French 1998, Schuster 1998, Stern 1998, U.S. Army 2002). During consultation in 2010 for the soil sampling and the installation of proposed groundwater monitoring wells, the CTUIR indicated that “historic properties of religious and cultural significance” are located on NWSTF Boardman (Dickson 2010).

A traditional use survey of lands within the NWSTF Boardman property boundary was conducted in 2013 by the CTUIR, and resources of religious and cultural significance eligible for listing on the NRHP were identified. The Navy and the CTUIR have agreed that the resources are considered traditional cultural properties (i.e., eligible for inclusion in the NRHP) and will be treated and managed as eligible resources. The location and types of American Indian traditional cultural properties identified at NWSTF Boardman is proprietary sacred information and cannot be publicly disseminated. Therefore, further description of these traditional cultural properties is not provided here.

3.10.2.7 Current Requirements and Management Practices

Cultural resources at NWSTF Boardman are managed in accordance with the NHPA, the Archaeological Resources Protection Act, the Archeological and Historic Preservation Act, the American Indian Religious Freedom Act, NAGPRA, appropriate Navy Instructions, and the *NWSTF Boardman ICRMP* (U.S. Department of the Navy 2015).

3.10.3 Environmental Consequences

The impacts analyzed for archaeological sites are ground-disturbing activities during construction, training, and range maintenance. Ground-disturbing activities during construction include surface grading; building excavation and construction; road construction and use; utility line trenching; use of staging areas for heavy equipment and supplies; borrow pit excavations; and other activities. For training activities, physical strikes could result from non-explosive projectile impacts and equipment air drops. Ground-disturbing activities in the area of a NRHP-eligible archaeological site, or modification to such a site, can affect the physical integrity of that cultural resource, resulting in alteration or destruction of those characteristics or qualities that make it eligible for inclusion in the NRHP. Noise and visual intrusions may affect the historic setting and feeling of archaeological sites.

The impacts analyzed for historic trails are ground-disturbing activities during construction and training activities, audio or visual intrusions, and inadvertent or intentional vandalism of trail features. Any noise or visual intrusion to the setting can affect the integrity of a NRHP-eligible historic trail, resulting in alteration or destruction of those characteristics or qualities that make it eligible for inclusion in the NRHP.

The impacts analyzed for architectural resources are physical disturbance from modification or alteration, demolition, vibration from aircraft overflights and munitions detonations, and inadvertent or intentional vandalism of architectural resources. In some cases, short-term audio intrusions during construction and visual intrusions to settings and cultural landscapes from new and incompatible construction may also occur. Any noise or visual intrusion to the setting, or demolition or alteration of architectural traits can affect the integrity of a NRHP-eligible architectural resource, resulting in alteration or destruction of those characteristics or qualities that make it eligible for inclusion in the NRHP.

The impacts analyzed for American Indian traditional cultural properties are physical disturbance and audio or visual intrusions that may result in loss of integrity, character, or feeling of the resource resulting in a loss of cultural continuity. Temporary audio or visual intrusions during construction activities and permanent, intermittent intrusions during training activities from aircraft overflights, vehicle operation, weapons firing, and munitions detonations (explosive ordnance disposal training) may disrupt the visual and audio landscape or the viewshed of American Indian traditional cultural properties which may require uninterrupted vistas and natural quiet. Any ground-disturbing action or audio or visual intrusion in the area of an American Indian traditional cultural property can affect the physical integrity of that cultural resource, resulting in alteration or destruction of the special American Indian quality (sacredness) of the resource.

Any physical disturbance of a NRHP-listed or -eligible cultural resource, or modification to such a resource can result in alteration or destruction of those characteristics or qualities that make it eligible for inclusion in the NRHP and, thus, would be an adverse effect under Section 106 of the NHPA. If unresolved by the Section 106 process, such adverse effects would be considered a significant impact under the NEPA process.

As discussed in Section 3.10.2.2 (Area of Potential Effects), two APEs were identified based on activities associated with the Proposed Action (e.g., ground disturbance, noise, and visual intrusions) and the types of resources that could be affected by these activities:

- The direct APE for ground-disturbing activities consists of about 1,927 ac. (780.01 ha) at NWSTF Boardman (see Figure 3.10-1). This direct APE includes archaeological resources, historic trails, architectural resources, and American Indian traditional cultural properties that could be impacted by ground disturbances that would occur under Alternatives 1 and 2.
- The indirect APE for activities that could generate noise, vibration, and visual intrusions consists of areas that are located beneath Restricted Areas 5701A-E and the proposed Boardman Low MOA (see Figure 3.10-2). The indirect APE for noise and visual intrusions includes archaeological sites, historic trails, architectural resources, and American Indian traditional cultural properties in which historic setting may be critical to their eligibility for the NRHP (e.g., the Well Spring Segment of the Oregon Trail). For this undertaking, vibration intrusions apply to historic architectural resources, which could be affected by vibration from aircraft overflights.

3.10.3.1 No Action Alternative

3.10.3.1.1 Archaeological Resources

Under the No Action Alternative, existing military readiness activities would continue and no new range enhancements would be constructed. No archaeological sites eligible for listing in the NRHP are located in areas where ground-disturbing military readiness activities currently take place (i.e., the Main Target Area, the existing strafing pit, and existing unmanned aerial systems airstrip). No known archaeological sites would be impacted by military readiness activities under the No Action Alternative. No impacts to known archaeological sites eligible for listing in the NRHP and located within the indirect APE would occur from implementation of the No Action Alternative. Cultural resources would continue to be managed in accordance with current federal law, Navy policy, and the *NWSTF Boardman ICRMP* (U.S. Department of the Navy 2015).

3.10.3.1.2 Historic Trails

Under the No Action Alternative, existing military readiness activities would continue and no new range enhancements would be constructed. No segments of historic trails eligible for listing in the NRHP are located in areas where ground-disturbing military readiness activities currently take place (i.e., the Main Target Area, the existing strafing pit, and existing unmanned aerial systems airstrip). No known historic trails would be impacted by ground-disturbing activities under the No Action Alternative.

Visual and noise intrusions to the setting of the Well Spring Segment of the Oregon Trail and Lower Well Spring Diversion of the Well Spring Segment would not change under the No Action Alternative, and would be similar to those that existed when these segments were evaluated as eligible for the NRHP. At that time, it was determined that training activities did not diminish the integrity of setting, feeling, and association; otherwise, these segments of the Oregon Trail would have been determined not eligible for the NRHP. No impacts to known historic trails eligible for listing in the NRHP and located within the indirect APE would be anticipated from the No Action Alternative. Cultural resources would continue to be managed in accordance with current federal law, Navy policy, and the *NWSTF Boardman ICRMP* (U.S. Department of the Navy 2015).

3.10.3.1.3 Architectural Resources

No impacts on architectural resources would occur in the direct APE as a result of the No Action Alternative because no architectural resources eligible for listing in the NRHP are located on NWSTF Boardman. Noise and visual intrusions from aircraft overflights would be transient in nature and brief in duration, and would not permanently affect the setting of architectural resources within the indirect APE. Several studies have been conducted on the effects of aircraft overflights on cultural resources (Battis 1988, Hanson et al. 1991). Vibration studies indicate that, with the exception of heavy helicopters (studied at 50 ft. [15.2 m] above ground level), subsonic aircraft overflights do not generate sufficient vibrations to cause physical damage to architectural resources, including unreinforced brick buildings like the headquarters building and the firehouse. Low-altitude aircraft training activities associated with both fixed-wing and rotary-wing aircraft (helicopters) would occur in the existing Restricted Area 5701 over NWSTF Boardman and adjacent agricultural areas (Figure 3.10-2). Pilots avoid flying at low altitudes over congested areas such as towns (1,000 ft. [305 m] above ground level) and over structures in rural areas (500 ft. [152 m] above ground level) in accordance with the minimum safe altitudes specified in 14 C.F.R. §91.119. Therefore, if any historic buildings or structures existed beneath Restricted Area 5701, they would not likely be impacted by such training activities.

3.10.3.1.4 American Indian Traditional Cultural Properties

Under the No Action Alternative, existing military readiness activities would continue and no new range enhancements would be constructed. Traditional cultural properties have been identified by the CTUIR within the NWSTF Boardman property boundary within the indirect APE. The Navy, in consultation with the CTUIR and Oregon SHPO, has determined that noise and visual intrusions associated with low-altitude aircraft overflights under the No Action Alternative would have a potential adverse effect on these traditional cultural properties. American Indian traditional cultural properties would continue to be managed in consultation with American Indian Tribes and in accordance with current federal law, Navy policy, and the *NWSTF Boardman ICRMP* (U.S. Department of the Navy 2015).

3.10.3.2 Alternative 1

3.10.3.2.1 Archaeological Resources

The direct APE does not contain archaeological sites eligible for listing in the NRHP; therefore, no impacts to these resources would occur under Alternative 1. Known archaeological sites that are eligible for listing in the NRHP were considered and avoided during the planning and siting process for the proposed range enhancements. No impacts to known archaeological sites eligible for listing in the NRHP and located within the indirect APE would occur from implementation of Alternative 1.

As discussed in Section 3.13 (Wildfire), the *Draft Integrated Wildland Fire Management Plan* (Appendix H) includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created (see Figure 3.13-3). The proposed new fire breaks would consist of about 19 ac. (7.7 ha) that would be maintained by disking, which could affect archaeological resources if they are present. The full process involved to establish new fire breaks would be through the Naval Air Station Whidbey Island Site Approval process, which would include archaeological survey and Section 106 consultation prior to construction of any new fire breaks.

In the event of inadvertent discovery of sensitive archaeological materials during construction, the Navy would ensure that measures are taken promptly to protect the find from disturbance, assess the significance of the discovery, and implement appropriate mitigation measures for significant resources. Inadvertent discovery of sensitive archaeological materials would be handled in accordance with the Navy's management practices contained in the *NWSTF Boardman ICRMP* (U.S. Department of the Navy 2015), which include provisions for stopping work and notifying the Naval Air Station Whidbey Island Cultural Resources Manager, the Oregon SHPO, and other appropriate parties.

If human remains are inadvertently discovered, then the procedures established under NAGPRA and OPNAVINST 11170.2 series, *Navy Responsibilities Regarding Undocumented Human Burials*, would be followed.

3.10.3.2.2 Historic Trails

The direct APE does not contain segments of historic trails eligible for listing in the NRHP; therefore, no impacts on these resources would occur under Alternative 1. Known segments of the Oregon Trail were considered and avoided during the planning and siting process for the proposed range enhancements. The direct APE is more than 2 mi. (3.2 km) from any portion of the Oregon Trail (see Figure 3.10-1).

Potential noise and visual intrusions to the setting of the Oregon Trail under Alternative 1 include increases in military readiness activities and construction of proposed range enhancements. These potential intrusions have been minimized by siting the proposed range enhancements to the north, away from the Oregon Trail. Permanent buildings would be constructed at the Range Operations and Control Areas for the Digital Multipurpose Training Range (DMPTR) and the MPMGR, which would be more than 6 mi. (9.7 km) from the Oregon Trail. The Joint-use Range Operations Control Center would be more than 8 mi. (12.9 km) from the Oregon Trail (see Figure 3.10-1). Noise during construction of these buildings is not expected to impact the setting based on distance from the Oregon Trail and because the noise would be temporary and intermittent. Likewise, no visual impacts to the setting are expected based on topography and distance of the buildings from the Oregon Trail. None of the buildings, other range enhancements, or ground-based training activities on the new ranges would be visible from the Oregon Trail interpretive area at the Emigrant Cemetery and Well Springs along the southern boundary of NWSTF Boardman. Members of the public visiting the Oregon Trail interpretive area might occasionally see and hear aircraft overflights, and might hear weapons firing on the new ranges. Visual and noise intrusions would be transient in nature, brief in duration, and would not permanently affect the overall setting, feeling, and association of the Well Spring Segment of the Oregon Trail or the Lower Well Spring Diversion of the Well Spring Segment under Alternative 1.

Although two segments of wagon roads are located within the indirect APE beneath the proposed Boardman Low MOA, no public access is permitted (i.e., absence of human noise receptors). Noise and visual intrusions from increased aircraft overflights would be transient in nature and brief in duration. Noise and visual intrusions from range construction and use of the new ranges would not affect these wagon road segments as these activities would occur on NWSTF Boardman located more than 12 mi. (19.3 km) west.

3.10.3.2.3 Architectural Resources

No architectural resources eligible for listing in the NRHP are located in the direct APE. Therefore, ground-disturbing activities would not impact architectural resources.

The World War II era headquarters building (Building 1) and the firehouse (Building 2) at Umatilla Chemical Depot are within the indirect APE. Noise and visual intrusions from range construction and use of the new ranges would not affect these buildings because these activities would occur on NWSTF Boardman, which is more than 12 mi. (19.3 km) west of these buildings. Noise and visual intrusions from aircraft overflights would be transient in nature and brief in duration, and would not permanently affect the setting. Several studies have been conducted on the effects of aircraft overflights on cultural resources (Battis 1988, Hanson et al. 1991). Vibration studies indicate that, with the exception of heavy helicopters (studied at 50 ft. above ground level), subsonic aircraft overflights do not generate sufficient vibrations to cause physical damage to architectural resources, including unreinforced brick buildings like the headquarters building and the firehouse. Low-altitude aircraft training activities associated with both fixed-wing and rotary-wing aircraft (helicopters) would occur in the existing Restricted Area 5701 over NWSTF Boardman and adjacent agricultural areas, as well as the proposed Boardman Low MOA (Figure 3.10-2). Pilots avoid flying at low altitudes over congested areas such as towns (1,000 ft. [305 m] above ground level) and over structures in rural areas (500 ft. [152 m] above ground level) in accordance with the minimum safe altitudes specified in 14 C.F.R. §91.119. Therefore, if any other historic buildings or structures existed within the indirect APE, they would not likely be impacted by such training activities.

3.10.3.2.4 American Indian Traditional Cultural Properties

Traditional cultural properties have been identified by the CTUIR within the NWSTF Boardman property boundary within the indirect APE. The Navy, in consultation with the CTUIR, determined that noise and visual intrusions associated with aircraft overflights and noise associated with weapons firing on the proposed ranges would have a potential adverse effect on these traditional cultural properties under Alternative 1. The Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (October 2015) (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA.

3.10.3.3 Alternative 2

3.10.3.3.1 Archaeological Resources

The direct APE does not contain archaeological sites eligible for listing in the NRHP; therefore, no impacts to these resources would occur under Alternative 2. Known archaeological sites that are eligible for listing in the NRHP were considered and avoided during the planning and siting process for the proposed range enhancements. No impacts to known archaeological sites eligible for listing in the NRHP and located within the indirect APE would occur from implementation of Alternative 2.

As discussed in Section 3.13 (Wildfire), the *Draft Integrated Wildland Fire Management Plan* (Appendix H) includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created (Figure 3.13-3). The proposed new fire breaks would consist of about 19 ac. (7.7 ha) that would be maintained by disking, which could affect archaeological resources if they are present. The full process involved to establish new fire breaks would be through the Naval Air Station Whidbey Island Site Approval process, which would include archaeological survey and Section 106 consultation prior to construction of any new fire breaks.

In the event of inadvertent discovery of sensitive archaeological materials during construction, the Navy would ensure that measures are taken promptly to protect the find from disturbance, assess the significance of the discovery, and implement appropriate mitigation measures for significant resources. Inadvertent discovery of sensitive archaeological materials would be handled in accordance with the Navy's management practices contained in the *NWSTF Boardman ICRMP* (U.S. Department of the Navy 2015), which include provisions for stopping work and notifying the Naval Air Station Whidbey Island Cultural Resources Manager, the Oregon SHPO, and other appropriate parties.

If human remains are inadvertently discovered, then the procedures established under NAGPRA and OPNAVINST 11170.2 series, *Navy Responsibilities Regarding Undocumented Human Burials*, would be followed.

3.10.3.3.2 Historic Trails

The direct APE does not contain segments of historic trials eligible for listing in the NRHP; therefore, no impacts on these resources would occur under Alternative 2. Known segments of the Oregon Trail were considered and avoided during the planning and siting process for the proposed range enhancements. The direct APE is more than 2 mi. (3.2 km) from any portion of the Oregon Trail (see Figure 3.10-1).

Potential noise and visual intrusions to the historic setting of the Oregon Trail under Alternative 2 include increases in military readiness activities and construction of proposed range enhancements. These potential intrusions have been minimized by siting the proposed range enhancements to the north, away from the Oregon Trail. Permanent buildings would be constructed at the Range Operations and Control Area for the MPMGR, which would be more than 6 mi. (9.7 km) from the Oregon Trail. The DMPTR would not be constructed under Alternative 2. The Joint-use Range Operations Control Center would be more than 8 mi. (12.9 km) from the Oregon Trail (see Figure 3.10-1). Noise during construction of these buildings is not expected to impact the setting based on distance from the Oregon Trail and because the noise would be temporary and intermittent. Likewise, no visual impacts to the setting are expected based on topography and distance of the buildings from the Oregon Trail. None of the buildings, other range enhancements, or ground-based training activities on the new ranges would be visible from the Oregon Trail interpretive area at the Emigrant Cemetery and Well Springs along the southern boundary of NWSTF Boardman. Members of the public visiting the Oregon Trail interpretive area might occasionally see and hear aircraft overflights, and might hear weapons firing on the new ranges. Visual and noise intrusions would be transient in nature, brief in duration, and would not permanently affect the overall setting, feeling, and association of the Well Spring Segment of the Oregon Trail or the Lower Well Spring Diversion of the Well Spring Segment under Alternative 2.

Although two segments of wagon roads are located within the indirect APE beneath the proposed Boardman Low MOA, no public access is permitted (i.e., absence of human noise receptors). Noise and visual intrusions from increased aircraft overflights would be transient in nature and brief in duration. Noise and visual intrusions from range construction and use of the new ranges would not affect these wagon road segments as these activities would occur on NWSTF Boardman located more than 12 mi. (19.3 km) west.

3.10.3.3.3 Architectural Resources

No architectural resources eligible for listing in the NRHP are located in the direct APE. Therefore, ground-disturbing activities would not impact architectural resources.

The World War II era headquarters building (Building 1) and the firehouse (Building 2) at Umatilla Chemical Depot are within the indirect APE. Noise and visual intrusions from range construction and use of the new ranges would not affect these buildings as these activities would occur on NWSTF Boardman located more than 12 mi. (19.3 km) west. Noise and visual intrusions from aircraft overflights would be transient in nature and brief in duration, and would not permanently affect the setting. Several studies have been conducted on the effects of aircraft overflights on cultural resources (Battis 1988, Hanson et al. 1991). Vibration studies indicate that, with the exception of heavy helicopters (studied at 50 ft. [15.2 m] above ground level), subsonic aircraft overflights do not generate sufficient vibrations to cause physical damage to architectural resources, including unreinforced brick buildings like the headquarters building and the firehouse. Low-altitude aircraft training activities associated with both fixed-wing and rotary-wing aircraft (helicopters) would occur in the existing Restricted Area 5701 over NWSTF Boardman and adjacent agricultural areas, as well as the proposed Boardman Low MOA. For safety reasons, pilots avoid flying at low altitudes over existing structures; therefore, if any other historic buildings or structures existed within the indirect APE, they would not likely be impacted by such training activities.

3.10.3.3.4 American Indian Traditional Cultural Properties

Traditional cultural properties have been identified by the CTUIR within the NWSTF Boardman property boundary within the indirect APE. The Navy, in consultation with the CTUIR, determined that noise and visual intrusions associated with aircraft overflights and noise associated with weapons firing on the proposed ranges would have a potential adverse effect on traditional cultural properties under Alternative 2. The Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (October 2015) (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA.

3.10.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.10.3.4.1 Proposed Management Practices

Cultural resources at NWSTF Boardman would continue to be managed in accordance with the NHPA, the Archaeological Resources Protection Act, the Archeological and Historic Preservation Act, the

American Indian Religious Freedom Act, NAGPRA, appropriate Navy Instructions, and the *NWSTF Boardman ICRMP* (U.S. Department of the Navy 2015) under Alternatives 1 and 2.

3.10.3.4.2 Proposed Monitoring

No monitoring is required for cultural resources during construction of the range enhancements proposed under Alternative 1 or Alternative 2 because no NRHP-eligible or -listed archaeological resources, historic trails, architectural resources, or American Indian traditional cultural properties are located in the direct APE. However, if during development activities the Navy or ORNG inadvertently discovers any cultural material (i.e., prehistoric or historic), all activities shall cease immediately and the Naval Air Station Whidbey Island Cultural Resources Manager, who is also an archaeologist, shall be contacted to evaluate the discovery.

No monitoring is required for archaeological resources, historic trails, or architectural resources in the indirect APE because the Proposed Action has no potential to cause physical damage to or deterioration of these resources within the indirect APE. Potential adverse effects within the indirect APE would be limited to transient noise and visual intrusions that would affect the setting of traditional cultural properties. The Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (October 2015) (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources, including a monitoring plan, in accordance with Section 106 of the NHPA. The Memorandum of Agreement includes stipulations for monitoring traditional cultural properties in cooperation with the CTUIR.

3.10.3.4.3 Proposed Mitigation Measures

No mitigation measures are required for archaeological resources, historic trails, or architectural resources because no NRHP-eligible or -listed archaeological resources, historic trails, or architectural resources would be impacted. Potential adverse effects on traditional cultural properties have been identified by the Navy in consultation with the CTUIR. The Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (October 2015) (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA.

3.10.3.5 Summary of Effects and Conclusions

Under the No Action Alternative, Alternative 1, and Alternative 2, known archaeological sites and the Oregon Trail were considered and avoided during the planning and siting process for the proposed range enhancements. Survey results indicate that no archaeological sites, historic trail segments, or architectural resources eligible for listing in the NRHP are located in the direct APE.

Under the No Action Alternative, Alternative 1, and Alternative 2, visual intrusions from increased aircraft overflights and noise intrusions from range construction, increased aircraft overflights, and increased range operations would be transient in nature and brief in duration, and would not permanently affect the overall setting of the Well Spring Segment of the Oregon Trail or the two segments of wagon roads located beneath the proposed Boardman Low MOA. The World War II era headquarters building (Building 1) and the firehouse (Building 2) would not be adversely affected by noise, visual, or vibration intrusions, nor would any other historic property should they exist within the indirect APE because pilots avoid low-altitude maneuvers near existing structures.

Under the No Action Alternative, Alternative 1, and Alternative 2, the Navy, in consultation with the CTUIR, determined that noise and visual intrusions associated with aircraft overflights and noise associated with weapons firing on the proposed ranges would have a potential adverse effect on traditional cultural properties (Table 3.10-2). Accordingly, the Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (October 2015) (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA. Copies of correspondence are provided in Appendix C (Tribal and Cultural Correspondence).

Table 3.10-2: Summary of Impacts on Cultural Resources, Naval Weapons Systems Training Facility Boardman, Oregon

Alternative and Stressor	Summary of Effects and Impact Conclusion	
	Section 106	National Environmental Policy Act
No Action Alternative	Potential adverse effect on historic properties. The Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA.	No adverse effect on archaeological resources, historic trails, or architectural resources. Noise and visual intrusions associated with aircraft overflights would have a potential adverse effect on traditional cultural properties. However, the No Action Alternative would not result in significant impacts on cultural resources based on the Memorandum of Agreement (Appendix C) to resolve potential adverse effects.
Alternative 1	Potential adverse effect on historic properties. The Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA.	No adverse effect on archaeological resources, historic trails, or architectural resources. Noise and visual intrusions associated with aircraft overflights and noise associated with weapons firing on the proposed ranges would have a potential adverse effect on traditional cultural properties. However, Alternative 1 would not result in significant impacts on cultural resources based on the Memorandum of Agreement (Appendix C) to resolve potential adverse effects.
Alternative 2	Potential adverse effect on historic properties. The Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA.	No adverse effect on archaeological resources, historic trails, or architectural resources. Noise and visual intrusions associated with aircraft overflights and noise associated with weapons firing on the proposed ranges would have a potential adverse effect on traditional cultural properties. However, Alternative 2 would not result in significant impacts on cultural resources based on the Memorandum of Agreement (Appendix C) to resolve potential adverse effects.

Notes: SHPO = State Historic Preservation Office, CTUIR = Confederated Tribes of the Umatilla Indian Reservation, ACHP= Advisory Council on Historic Preservation, NHPA = National Historic Preservation Act.

3.11 AMERICAN INDIAN TRADITIONAL RESOURCES

3.11.1 INTRODUCTION

3.11.1.1 Overview

American Indian traditional resources are those resources that embody the beliefs, customs, and practices of a living community of people, in this case American Indians. The place of these resources in the culture has been passed down through the generations, usually orally or through practice. The traditional cultural significance of a resource arises from the role it plays in a community's historically rooted beliefs, customs, and practices (National Park Service 1998). Protected tribal resources, as defined in Department of Defense (DoD) Instruction 4710.02, *DoD Interactions with Federally-Recognized Tribes*, are "those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by or reserved by or for Indian tribes through treaties, statutes, judicial decisions, or executive orders (EOs), including tribal trust resources." This section addresses American Indian traditional resources and protected tribal resources at Naval Weapons Systems Training Facility (NWSTF) Boardman that are retained or reserved by or for American Indian Tribes through treaties. These resources include plants, animals, habitat, and locations associated with hunting, fishing, and gathering activities for subsistence or ceremonial use. Other American Indian resources such as traditional cultural properties are addressed in Section 3.10 (Cultural Resources).

3.11.1.2 Regulatory Framework

American Indian Tribes are dependent sovereign nations. Accordingly, the United States has a trust relationship with American Indian Tribes. The DoD American Indian and Alaska Native Policy states: "Under the federal trust doctrine, the United States—and individual agencies of the federal government—owe a fiduciary duty to Indian tribes. The nature of that duty depends on the underlying substantive laws (i.e., treaties, statutes, agreements) creating the duty. Where agency actions may affect Indian lands or off-reservation treaty rights, the trust duty includes a substantive duty to protect these lands and treaty rights to the fullest extent possible." Otherwise, unless the law imposes a specific duty on the federal government with respect to Indians, the trust responsibility may be discharged by the agency's compliance with general statutes and regulations not specifically aimed at protecting Indian tribes." The trust responsibility has been interpreted to require federal agencies to carry out their activities in a manner that is protective of American Indian treaty rights. EO 13175, *Consultation and Coordination with Indian Tribal Governments,* affirms the trust responsibility of the United States and directs agencies to consult with American Indian Tribes and respect tribal sovereignty when taking actions affecting such rights.

Treaties between the United States and American Indian Tribes are government-to-government agreements and are "the Supreme law of the land." Tribal treaty rights are not affected by later federal laws (unless Congress clearly abrogates treaty rights). Treaty language securing fishing and hunting rights is not a "grant of rights (from the federal government to the Indians), but a grant of rights from them—a reservation of those not granted" (*United States v. Winans*, 25 S. Ct. 662, 1905). This means that the Tribes retain rights not specifically surrendered to the United States.

On October 21, 1998, DoD promulgated its American Indian and Alaska Native Policy emphasizing the importance of respecting and consulting with tribal governments on a government-to-government basis (explanatory text was added on November 21, 1999). The Policy requires that DoD consult with federally-recognized American Indian and Alaska Native Tribes on a government-to-government basis when proposed actions have the potential to significantly affect protected tribal resources, tribal rights, or Indian lands prior to reaching a decision. In 2005, the Navy updated its policy for consultation with federally-recognized American Indian Tribes. The Secretary of the Navy Instruction (SECNAVINST) 11010.14A, Department of the Navy Policy for Consultation with Federally-Recognized Tribes (October 11, 2005), implements DoD policy within the Navy and encourages ongoing consultation and communications. Commander Navy Region Northwest (COMNAVREGNW) Instruction 11010.14, *Policy for Consultation with Federally-Recognized American Indian and Alaska Native Tribes* (November 10, 2009), sets forth policy, procedures, and responsibilities for consultations with federally-recognized tribal governments. The goal of the policy is to establish permanent government-to-government working relationships built upon respect, trust, and openness with tribal governments.

Other federal laws, EOs, and memoranda requiring consultation with American Indians include the National Historic Preservation Act; the American Indian Religious Freedom Act; the Archaeological Resources Protection Act; the Native American Graves Protection and Repatriation Act (NAGPRA); EO 12898, *Environmental Justice*; EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; the Presidential Memorandum dated November 5, 2009 emphasizing agencies' need to comply with EO 13175; and the Presidential Memorandum dated April 29, 1994, *Government-to-Government Relations with Native American Governments*.

3.11.1.3 Determination of Significance

Factors considered when determining if an alternative could have a significant impact on American Indian traditional resources included whether and to what degree the resource would be affected and whether access by tribal members to the resource would change. Government-to-government consultation was conducted with potentially affected federally-recognized American Indian Tribes to identify affected resources, evaluate the extent of any adverse effects, determine the significance of impacts, and develop mitigation measures, if necessary.

3.11.2 AFFECTED ENVIRONMENT

3.11.2.1 Cultural Context

The following summary of the ethnohistory at NWSTF Boardman is derived or excerpted from information in *Archaeological Research at the Proposed MPMG and MPTR Ranges, United States Naval Weapons System Training Facility, Boardman, Morrow County, Oregon* (Oregon National Guard 2005) and *Cultural Resource Assessment and Evaluation of the Well Springs Diversion of the Boardman Section of the Oregon Trail, Morrow County, Oregon, Located on Naval Weapons Training Facility, Boardman* (U.S. Department of the Navy 1997).

Many American Indian groups occupied, hunted and gathered, or traveled through the area that is now NWSTF Boardman. Today, they are represented by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Confederated Tribes of the Warm Springs of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe.

NWSTF Boardman and vicinity are part of the ceded lands of the Umatilla, Cayuse, and Walla Walla Tribes as well as a small portion of the ceded lands of the Yakama. The Umatilla lived along both sides of the Columbia River from present-day Arlington, Oregon, to a few miles west of the mouth of the Walla Walla River. The Umatilla also inhabited the lower Umatilla River from the mouth to a few miles above its confluence with Butter Creek. The Umatilla were flanked on the east by the Cayuse, who had winter camps on both banks of Butter Creek, and on the west by the Walla Walla. The Cayuse spoke "a distinct language of their own with uncertain affinities, perhaps within the Penutian superfamily" (Stern 1998).

The three groups shared similar economic, social, and ceremonial characteristics and were therefore considered a single unit by many observers. The Umatilla, Cayuse, and Walla Walla probably traveled and jointly used resources on present-day NWSTF Boardman. The Yakama inhabited the area from the Cascade Mountains on the west, Columbia River to the south, and the Yakima River to the east.

As with most other southern Plateau peoples, Umatilla subsistence was based on root crops and salmon. In the spring, women and children traveled to the Grande Ronde valley and other areas to dig camas, lomatium, bitterroot, and other root crops while the men fished. In late spring and summer, families moved up the tributaries with the fish runs. During the summer months, the Umatilla and other groups lived in small villages of mat lodges and fish drying sheds, processing salmon and roots for immediate consumption as well as for winter storage. Families might spend several weeks in the uplands, with the men hunting deer and elk while women and children picked berries, gathered roots, and dried fish. By autumn, hunting parties spread out into the nearby Blue Mountains. Deer, elk, antelope, bears, and other large and small mammals were taken by means of decoys and drives (Stern 1998). Hunting camps were established to butcher and dry the meat and to process the skins. After acquiring the horse in the mid-1700s, the Cayuse became an equestrian-oriented people, using their horses to travel between winter villages on the mountains to hunt and acquire plant resources. The Yakama subsistence pattern was seasonally based and similar to the Umatilla and consisted of salmon fishing along the Columbia and Yakima rivers and their tributaries in the spring and early summer and hunting and plant gathering in the upper elevations during the summer and fall (Schuster 1998). Large villages were located along the major rivers with fishing stations along the rivers and hunting and gathering camps in the uplands (Schuster 1998).

The winter settlements nearest present-day NWSTF Boardman belonged to a group of Cayuse on Butter Creek. The nearest Umatilla winter houses were on the Columbia River around present-day Alderdale. The Umatilla wintered in longhouses constructed with a tripod pole frame that often measured up to 80 feet (24.4 meters) in length. The floors were covered with mats, and the longhouses could accommodate eight fires.

Plateau culture was first influenced by European trade items from the coastal groups encountering British and Spanish explorers in the late eighteenth century. The Lewis and Clark Expedition passed through Umatilla and Cayuse territory while traveling down the Columbia River to the Pacific Ocean in 1805 and during their return trip in 1806. After the expedition, fur traders and missionaries began traveling through the Plateau region, establishing relationships with the Umatilla and Cayuse. The Northwest Company built Fort Walla Walla in 1818. The fort, like others of its kind in the early 1800s, was a multicultural institution composed of Native Americans, Euroamericans, and Metis. Native Americans were allowed to store roots at the fort, and they used the fort as a nexus for trade and news (Stern 1998).

In 1855, a treaty was signed by representatives of the various American Indian bands of the Umatilla, Cayuse, and Walla Walla and Isaac Stevens, governor of Washington territory and its superintendent of Indian affairs. In the Treaty of 1855, the Cayuse, Umatilla, and Walla Walla Tribes ceded to the United States more than 6,400,000 acres (ac.) (2,589,992 hectares [ha]) of land in what is now northeastern Oregon and southeastern Washington, including present-day NWSTF Boardman. A parcel of land, designated the Umatilla Indian Reservation, was retained by the Tribes as a permanent homeland. Also in the Treaty of 1855, the Tribes reserved pre-existing rights to fish, hunt, and gather traditional foods and medicines throughout their traditional areas. The Umatilla Indian Reservation was created in 1859, and the Confederated Tribes of the Umatilla, Cayuse, and Walla Walla moved to reservation lands.

However, large numbers of the Umatilla and Walla Walla remained in their homelands along the Columbia River and continued their seasonal use of the region (Stern 1998). The Tenino moved to the Warm Springs Indian Reservation in 1855.

Following the move to the reservation, new conflicts arose between the American Indians and the Euroamerican miners, immigrants, and townspeople of the region. The newcomers realized that the reservation consisted primarily of fertile and productive agricultural land. Initial attempts to move the Indians elsewhere to open their lands to farming failed. The federal government upheld the American Indians' right to remain on their land in 1871 and again in 1878 (Stern 1998).

In 1885, the allotment system began, which undermined Indian efforts to successfully farm their land by rendering the cost of taxes and equipment unaffordable. Much of the reservation land was leased or sold to Euro-American ranchers and farmers. Since the 1960s, the CTUIR has carried out programs that have consolidated tribal land and developed economic resources (Stern 1998).

3.11.2.2 Treaty Rights

Treaties with American Indian Tribes are government-to-government agreements, similar to international treaties, and preempt contrary state laws. Tribal treaty rights are not affected by later federal laws (unless Congress clearly abrogates treaty rights). Language in treaties and other federal laws securing off-reservation fishing and hunting rights has been construed as preserving aboriginal rights that American Indian Tribes traditionally exercised before the treaties were executed. Treaty fishing and hunting clauses are not a "grant of rights (from the federal government to the Indians), but a grant of rights from them - a reservation of those not granted" (United States v. Winans, 25 S. Ct. 662, (1905)). This means that the Tribes retain rights not specifically surrendered to the United States. Between 1854 and 1856, the United States negotiated treaties with the northwest Tribes to acquire great expanses of land. The treaties collectively are called the Stevens-Palmer Treaties, after Isaac I. Stevens, the governor of the Washington Territory, and Joel Palmer, the superintendent of Indian Affairs for the Oregon Territory, who negotiated the treaties on behalf of the United States (Woods 2005).

3.11.2.2.1 Treaty with the Walla Walla, Cayuse, and Umatilla 1855 (12 Stat. 945)

The outcome of the 1855 treaty negotiations was that the Cayuse, Umatilla, and Walla Walla retained a reservation in the Cayuse homeland. The tribes ceded 6.4 million ac. (2, 589,992 ha) to the United States, reserved rights for fishing, hunting, gathering foods and medicines, and pasturing livestock, and reserved 510,000 ac. (206,390 ha) on which to live (Confederated Tribes of the Umatilla Indian 1996). The treaty was signed on June 9, 1855 and ratified by the U.S. Congress on March 8, 1859.

The treaty with the Walla Walla, Cayuse, and Umatilla signed by the federal government on June 9, 1855, secured these Tribes the following under Article 1:

- A tract of land set aside as a residence for the Walla Walla, Cayuse, and Umatilla and regarded as an Indian Reservation.
- The exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians, and at all other usual and accustomed stations in common with citizens of the United States, and of erecting suitable buildings for curing the same; the privilege of hunting, gathering roots and berries and pasturing their stock on unclaimed lands in common with citizens, is also secured to them.

As a result of United States (U.S.) Congressional legislation in the late 1800s that diminished its size and allowed purchase and ownership by non-American Indians, the Umatilla Indian Reservation now consists of 172,000 ac. (69605.9 ha); nearly half is owned by non-American Indians (Confederated Tribes of the Umatilla Indian 1996).

NWSTF Boardman is within the lands ceded to the United States in 1855 by the Walla Walla, Cayuse, and Umatilla (Confederated Tribes of the Umatilla Indian 2013). However, the U.S. Department of the Navy (Navy) does not consider NWSTF Boardman to be open and unclaimed lands based on case law (American Indian Law Deskbook 2004). At the time of signing treaty documents, the term "open and unclaimed lands" applied to public domain lands held by the United States that had not been fenced or claimed through a land settlement act. Today, the term applies to lands remaining in the public domain (for the purposes of hunting, gathering foods, and grazing livestock or trapping) (National Forest Service 1997). Federal and state courts have ruled that public land is "open and unclaimed" unless it is being put to a use that is inconsistent with tribal hunting. For example, in *United States v. Hicks*, 587 F. Supp. 1162 (W.D. Wash), a federal district court ruled that the Olympic National Park was not "open and unclaimed" because one of its purposes is the preservation of native wildlife and because hunting is generally prohibited in the park.

The area now encompassing NWSTF Boardman was withdrawn from public lands in 1941 to be used for military training. Current military readiness activities such as weapons firing and air-to-ground bombing exercises are inherently dangerous. In addition, safety concerns such as the presence of unexploded ordnance exist from historic military use of the property. Public access to NWSTF Boardman is controlled per Naval Air Station Whidbey Island Instruction 8020.8 *Ground Entry/Access to NWSTF Boardman* for security reasons and to safeguard against potential hazards. Entry/access is restricted to official business only (i.e., military readiness activities and direct training support activities), with the exception of a cultural interpretive area at the Pioneer cemetery along the southern boundary that is open to the public. Currently, no hunting or gathering is allowed because these activities are considered incompatible with military readiness activities at NWSTF Boardman. Therefore, the Navy does not consider NWSTF Boardman to be open and unclaimed lands.

3.11.2.2.2 Treaty with the Yakama 1855 (12 Stat. 951)

In 1855, the Confederated Tribes and Bands of the Yakama Nation (consisting of the Yakama, Palouse, Pisquouse, Wenatshapam, Klikatat, Klinquit, Kowwas-say-ee, Li-ay-was, Skin-pah, Wish-ham, Shyiks, Ochechotes, Kah milt-pah, and Se-ap-cat, confederated Tribes and bands of Indians) ceded to the United States over 12,000,000 ac. (4,856,235 ha) of land in what is now central Washington (U.S. Government 1855). A parcel of land, designated the Confederated Tribes and Bands of the Yakama Nation Reservation, was retained by the Tribes as a permanent homeland. The treaty was signed on June 9, 1855 and ratified by the U.S. Congress on March 8, 1859.

The treaty with the Confederated Tribes and Bands of the Yakama Nation signed by the federal government on June 9, 1855, secured this Tribe the following under Articles 2 and 3 (U.S. Government 1855):

- A tract of land set aside as a residence for the Yakama and regarded as an Indian Reservation.
- The exclusive right of taking fish in all the streams, where running through or bordering said reservation, is further secured to said confederated Tribes and bands of Indians, as also the right of taking fish at all usual and accustomed places, in common with the citizens of the Territory, and of erecting temporary buildings for curing them; together with the privilege of hunting,

> gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.

Although most of the lands ceded to the United States by the Confederated Tribes and Bands of the Yakama Nation are located in Washington, the ceded lands boundary extends south of the Columbia River into Oregon and includes a very small part of the northern portion of NWSTF Boardman (Yakama Nation 2013). As discussed above in Section 3.11.2.2.1 (Treaty with the Walla Walla, Cayuse, and Umatilla 1855 [12 Stat. 945]), the Navy does not consider NWSTF Boardman to be open and unclaimed lands.

3.11.2.2.3 Treaty with the Confederated Tribes of Warm Springs 1855 (12 Stat. 963)

Treaties with Oregon Tribes were negotiated and ratified by the United States between 1853 and 1864. These treaties established reservations in exchange for lands ceded by the Tribes although no off-reservation fishing or hunting rights were secured. The Treaty of Wasco, Columbia River, Oregon Territory with the Taih, Wyam, Tenino, and Dock-Spus Bands of the Walla Walla, and the Dalles, Ki-Gal-Twal-La, and the Dog River Bands of the Wasco who are now the Confederated Bands of the Warm Springs Reservation was signed by the federal government and representatives on June 25, 1855 and ratified by the U.S. Congress on March 8, 1859, secured these Tribes the following:

> That the exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians; and at all other usual and accustomed stations, in common with citizens of the United States, and of erecting suitable houses for curing the same; also the privilege of hunting, gathering roots and berries, and pasturing their stock on unclaimed lands, in common with citizens, is secured to them.

3.11.2.2.4 Treaty with the Nez Perce 1855 (12 Stat. 957)

Between 1854 and 1856, the United States negotiated treaties with Washington State tribes to acquire great expanses of land. The treaties collectively are called the Stevens-Palmer Treaties, after Isaac I. Stevens, the governor of the Washington Territory, and Joel Palmer, the superintendent of Indian affairs for the Oregon Territory, who negotiated the treaties on behalf of the United States (Woods 2005). The treaty with the Nez Perce was signed by the federal government in June 11, 1855 and ratified by the U.S. Congress on March 8, 1859; it secured the tribe the following:

> The exclusive right of taking fish in all the streams where running through or bordering said reservation is further secured to said Indians: as also the right of taking fish at all usual and accustomed places in common with citizens of the territory, and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.

3.11.2.3 American Indian Traditional Resources on Naval Weapons Systems Training Facility Boardman

The CTUIR have identified plant and animal resources on NWSTF Boardman that are of particular traditional importance.

A traditional use survey was conducted at NWSTF Boardman in 2013 by the CTUIR, and resources of religious and cultural significance eligible for listing on the NRHP were identified. The Navy and the CTUIR have agreed that the resources are considered traditional cultural properties (i.e., eligible for inclusion in the NRHP) and will be treated and managed as eligible resources. The location and types of

American Indian traditional cultural properties identified at NWSTF Boardman is proprietary sacred information and cannot be publicly disseminated. Therefore, further description of these traditional cultural properties is not provided here.

The CTUIR have expressed interest in collecting traditional plant resources and hunting big game animals (e.g., mule deer and elk) and upland game birds (e.g., ring-necked pheasant, gray partridge, chukar, and California quail) on NWSTF Boardman (Quaempts 2010, 2012). As discussed above in Section 3.11.2.2.1 (Treaty with the Walla Walla, Cayuse, and Umatilla 1855 [12 Stat. 945]), and in accordance with Naval Air Station Whidbey Island Instruction 8020.8, *Ground Entry/Access to NWSTF Boardman*, entry/access is currently restricted to official business only for security reasons and to safeguard against potential hazards. However, if in the future, the Navy should determine that hunting and/or gathering activities are appropriate uses on all or some portions of NWSTF Boardman, the Navy will work with the CTUIR to formalize an access plan for the facility, as stipulated in the Memorandum of Agreement executed by the Navy, the Oregon SHPO, CTUIR, and the Advisory Council on Historic Preservation (ACHP) (Appendix C). Even if the present generation of tribal members does not have access to NWSTF Boardman for hunting, the CTUIR has a strong interest in preserving wildlife habitat and populations for future generations.

The Confederated Tribes and Bands of the Yakama Nation indicates that NWSTF Boardman is within the usual and accustomed territory of the Yakama reserved through the Treaty of 1855 (Meninick 2011). The term “usual and accustomed stations or places” was used in several treaties in the Northwestern United States. It describes lands adjacent to streams, rivers, or shorelines to which a tribe(s) usually traveled or was accustomed to travel for the purpose of taking fish. Federal courts have either referred to or defined the term when deciding lawsuits about the extent of a tribe’s off-reservation treaty right to take fish. It has not been found by the courts to include hunting, gathering, grazing, or trapping (National Forest Service 1997). Although NWSTF Boardman lacks permanent surface waters and fish resources, the Columbia River is located about 2 miles (3.2 kilometers) north. Columbia River salmon are an important American Indian traditional resource, and the relationship between the people, the salmon, and the Columbia Basin is the foundation of the time-honored laws of the Yakama people (Yakama Nation Fisheries 2013).

3.11.2.4 Government-to-Government Consultation

In accordance with DoD policies and Navy instructions, the Navy conducts government-to-government consultation with federally-recognized American Indian Tribes when proposed actions have the potential to significantly affect tribal resources, tribal rights, or Indian lands. The Commander, U.S. Pacific Fleet invited the following federally-recognized American Indian Tribes to initiate government-to-government consultation in October 2010:

- The CTUIR
- The Confederated Tribes of the Warm Springs Reservation of Oregon
- The Confederated Tribes and Bands of the Yakama Nation
- The Nez Perce Tribe

The CTUIR, the Confederated Tribes of the Warm Springs of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe were invited to initiate government-to-government consultation for the Proposed Action because they represent descendants of the historic American Indian groups that occupied, hunted and gathered, or traveled through the area that is now NWSTF Boardman.

The Navy's government-to-to government consultation with the CTUIR included correspondence, tribal briefings, staff-level consultation phone calls, emails, and meetings, which led to a formal government-to-government consultation between the CTUIR Board of Trustees and the Commanding Officer of Naval Air Station Whidbey Island on July 11, 2013. Coordination with the CTUIR will continue and address topics that are outside the scope of this EIS.

The Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe did not request government-to-government consultation based on the Navy’s October 2010 invitation or subsequent communications.

3.11.2.5 Current Requirements and Management Practices

The Navy manages the protection of American Indian traditional resources at NWSTF Boardman and conducts government-to-government consultation with the CTUIR, the Confederated Tribes of the Warm Springs of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe in accordance with the American Indian Religious Freedom Act, NAGPRA, and appropriate Navy Instructions. Plant and wildlife resources are managed in accordance with the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012).

3.11.3 ENVIRONMENTAL CONSEQUENCES

3.11.3.1 No Action Alternative

Under the No Action Alternative, existing military readiness activities would continue and no new range enhancements would be constructed. As discussed in Section 3.5 (Vegetation), ongoing activities that could impact traditional plant resources include target maintenance and non-explosive practice munitions impacting the ground surface within the Main Target Area, and fire break maintenance. The ethnobotanical study did not specifically survey the Main Target Area. Traditional plant resources are not expected to occur in the target maintenance areas or fire breaks because these areas are maintained to be free of vegetation by disking. The Main Target Area and fire breaks have been subjected to similar maintenance and disturbance regimes for years. Traditional plant resources outside the Main Target Area and fire breaks would not be affected. Therefore, the No Action Alternative would not result in additional impacts on traditional plant resources or loss of associated habitat. Vegetation, including traditional plant resources, would continue to be managed under the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012).

Wildlife, including species such as mule deer and elk that were traditionally hunted by American Indians, would continue to be exposed to noise under the No Action Alternative. The primary source of noise would be low-altitude, fixed-wing aircraft overflights. Noise may elicit physiological and behavioral responses in wildlife. Exposed individuals would be expected to recover quickly from these responses, and exposure would be intermittent and infrequent. The short-term responses are not expected to affect the fitness of individuals. Therefore, population-level effects would not occur from noise. Impacts to wildlife habitat would be the same as described for vegetation above, and no additional loss of habitat would occur under the No Action Alternative.

While invasive plants would continue to degrade habitat at NWSTF Boardman under the No Action Alternative, additional habitat loss or degradation is not expected. Ground-disturbing activities would be limited to fire break maintenance, target maintenance, and projectile impacts in previously disturbed areas within the Main Target Area. The potential for aircraft, non-explosive practice munitions, and vehicles to strike wildlife would continue to exist. If strikes were to occur, no population-level effects would occur because only a small number of individuals would be affected. The effects of electromagnetic radiation and lasers on wildlife would be negligible or minor under the No Action Alternative. The combined effects of all stressors on wildlife are not expected to be appreciably different from the effects of individual stressors. A low probability of mortality exists from physical strikes, but the other stressors are not expected to affect the fitness of individuals. No measurable impacts on local wildlife populations are anticipated under the No Action Alternative.

Traditional fish resources do not occur on NWSTF Boardman and the No Action Alternative would have no effect on the Columbia River or its salmon stocks.

As discussed in Section 3.11.2.2 (Treaty Rights), access to NWSTF Boardman is limited to official business only for security and safety. As a result, tribal hunting and gathering do not currently take place on NWSTF Boardman and would not occur under the No Action Alternative. However, if in the future, the Navy should determine that hunting and/or gathering activities are appropriate uses on all or some portions of NWSTF Boardman, the Navy will work with the CTUIR to formalize an access plan for the facility, as stipulated in the Memorandum of Agreement executed by the Navy, the Oregon SHPO, CTUIR, and the ACHP (Appendix C).

Government-to-government consultation with American Indians would continue under the No Action Alternative in accordance with current federal law and Navy policy. Plant and wildlife resources would continue to be managed in accordance with the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012). The No Action Alternative would have no significant impact on American Indian traditional resources.

3.11.3.2 Alternative 1

As discussed in Section 3.5 (Vegetation), ground disturbance associated with Alternative 1 that could impact traditional plant resources includes new construction and training activities. The total area of construction disturbance would be 92 ac. (37 ha or 0.2 percent of NWSTF Boardman), 13 ac. (5.3 ha) of which are previously disturbed. Approximately 79 ac. (32 ha) of previously undisturbed area would be affected, about 50 ac. (20 ha) would be permanently converted to development, and about 29 ac. (12 ha) would be temporarily disturbed and revegetated in accordance with the post-construction restoration plan (Appendix F). Disturbance associated with training-related activities conducted in the Main Target Area under Alternative 1 would be the same as the No Action Alternative. However, training activities on the proposed new ranges would result in increased ground disturbance. Vegetation around targets on the new ranges would be disturbed by non-explosive practice munitions striking the ground and during target maintenance. Training activities under Alternative 1 would result in permanent localized effects on vegetation in the form of lost vegetation communities.

The ethnobotanical study did not specifically address areas that would be affected by Alternative 1. The total area of disturbance for construction represents a small portion of NWSTF Boardman (92 ac. [37 ha] or 0.2 percent), and traditional plant resources outside the proposed range enhancements would not be affected. Loss of individual traditional plants and habitat could occur under Alternative 1, but plant populations would not be affected. Traditional plant resources would continue to persist at NWSTF Boardman and would continue to be managed under the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012).

As discussed in Section 3.6 (Wildlife), the proposed range enhancements and increased training activities under Alternative 1 could affect wildlife and traditional animal resources. Construction activities would result in temporary disturbance and permanent loss of wildlife habitat. As discussed for traditional plant resources, the total area of disturbance for construction represents a small portion of NWSTF Boardman (92 ac. [37 ha] or 0.2 percent), and habitat outside the proposed range enhancements would not be affected by construction. Noise and human activity associated with construction and use of the new ranges would be expected to result in short-term behavioral responses in wildlife. Big game and upland game bird species would likely avoid the immediate area during construction and when the ranges are operational. However, population-level effects are not anticipated. Big game and upland game bird species would continue to persist at NWSTF Boardman and would continue to be managed under the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012).

As discussed for the No Action Alternative, traditional fish resources do not occur on NWSTF Boardman. Alternative 1 would have no effect on the Columbia River or its salmon stocks.

As discussed in Section 3.11.2.2 (Treaty Rights), access to NWSTF Boardman is limited to official business only for security and safety. Tribal hunting and gathering do not currently occur at NWSTF Boardman, and there would be no change under Alternative 1. However, if in the future, the Navy should determine that hunting and/or gathering activities are appropriate uses on all or some portions of NWSTF Boardman, the Navy will work with the CTUIR to formalize an access plan for the facility, as stipulated in the Memorandum of Agreement executed by the Navy, the Oregon SHPO, CTUIR, and the ACHP (Appendix C).

Government-to-government consultation with American Indians would continue under Alternative 1 in accordance with current federal law and Navy policy. Plant and wildlife resources would continue to be managed in accordance with the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012). Traditional plant and animal resources would be protected for future generations should the current safety and access situation change. Alternative 1 would have no significant impacts on American Indian traditional resources.

3.11.3.3 Alternative 2

Under Alternative 2, a second Convoy Live Fire Range (western CLFR) would be constructed, and the Joint-Use Range Operations Support Center would be constructed as a standalone building. However, the Digital Multipurpose Training Range would not be constructed under Alternative 2. Therefore, the total area of disturbance for Alternative 2 would decrease 27 ac. (11 ha) compared to Alternative 1 (from 92 ac. [37 ha] to 65 ac. [26 ha]). The area permanently converted to development under Alternative 2 would decrease 25 ac. (10 ha) compared to Alternative 1 (from 50 ac. (20 ha] to 25 ac. [10 ha]). Construction of the western CLFR would include placement of additional gravel on about 12 ac. (4.9 ha) of existing gravel road, but previously undisturbed areas would not be affected. Therefore, potential impacts on American Indian traditional resources under Alternative 2 would be similar, but less than those described for Alternative 1. Traditional plant, big game, and upland game bird species would continue to persist at NWSTF Boardman under Alternative 2 and would continue to be managed under the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012). Alternative 2 would have no effect on the Columbia River or its salmon stocks.

As discussed in Section 3.11.2.2 (Treaty Rights), access to NWSTF Boardman is limited to official business only for security and safety. Tribal hunting and gathering do not currently occur at NWSTF Boardman, and there would be no change under Alternative 2. However, if in the future, the Navy should determine that hunting and/or gathering activities are appropriate uses on all or some portions of NWSTF

Boardman, the Navy will work with the CTUIR to formalize an access plan for the facility, as stipulated in the Memorandum of Agreement executed by the Navy, the Oregon SHPO, CTUIR, and the ACHP (Appendix C).

Government-to-government consultation with American Indians would continue under Alternative 2 in accordance with current federal law and Navy policy. Plant and wildlife resources would continue to be managed in accordance with the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012). Traditional plant and animal resources would be protected for future generations should the current safety and access situation change. Alternative 2 would have no significant impacts on American Indian traditional resources.

3.11.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.11.3.4.1 Proposed ~~Best~~ Management Practices

The Navy would continue to manage the protection of American Indian traditional resources at NWSTF Boardman and conduct government-to-government consultation with the CTUIR, the Confederated Tribes of the Warm Springs of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe in accordance with the American Indian Religious Freedom Act, NAGPRA, and appropriate Navy Instructions. Plant and wildlife resources would continue to be managed in accordance with the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012).

3.11.3.4.2 Proposed Monitoring

Government-to-government consultation with CTUIR did not identify a need for additional monitoring of specific American Indian traditional plant and animal resources. Therefore, no additional monitoring is proposed for American Indian traditional resources under the No Action, Alternative 1, or Alternative 2.

3.11.3.4.3 Proposed Mitigation Measures

Government-to-government consultation with the CTUIR did not identify a need for mitigation measures effects to American Indian traditional plant and animal resources. Therefore, mitigation measures are not proposed for American Indian traditional resources under the No Action, Alternative 1, or Alternative 2.

3.11.3.5 Summary of Effects and Conclusions

The No Action Alternative, Alternative 1, and Alternative 2 would result in short- and long-term impacts on American Indian traditional plant and animal resources. However, the impacts would be minor and localized, and no population-level impacts are anticipated. Traditional plant, big game, and upland game bird species would continue to persist at NWSTF Boardman under each alternative and would continue to be managed under the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012). The alternatives would have no effect on the Columbia River or its salmon stocks. Tribal hunting and gathering does not currently take place at NWSTF Boardman, and this would not change under the No Action Alternative, Alternative 1, or Alternative 2. However, if in the future, the Navy should determine that hunting and/or gathering activities are appropriate uses on all or some portions of NWSTF Boardman, the Navy will work with the CTUIR to formalize an access plan for the facility, as stipulated in the Memorandum of Agreement executed by the Navy, the Oregon SHPO, CTUIR, and the ACHP (Appendix C).Traditional plant and animal resources would be protected for future generations should the current safety and access situation change. The No Action Alternative, Alternative 1, and Alternative 2 would have no significant impacts on American Indian traditional resources (Table 3.11-1).

Table 3.11-1: Summary of Impacts on American Indian Traditional Resources, Naval Weapons Systems Training Facility Boardman, Oregon

Alternative	Summary of Effects and National Environmental Policy Act Determination
No Action Alternative	• Short- and long-term impacts on American Indian traditional plant and animal resources from ground disturbance and noise. However, the impacts would be minor and localized, and no population-level impacts are anticipated. Tribal hunting and gathering does not currently take place at NWSTF Boardman, and this would not change. The No Action Alternative would not result in significant impacts on American Indian traditional resources.
Alternative 1	• Short- and long-term impacts on American Indian traditional plant and animal resources from ground disturbance, habitat loss, and noise. However, the impacts would be minor and localized, and no population-level impacts are anticipated. Tribal hunting and gathering does not currently take place at NWSTF Boardman, and this would not change. Alternative 1 would not result in significant impacts on American Indian traditional resources.
Alternative 2	• Short- and long-term impacts on American Indian traditional plant and animal resources from ground disturbance, habitat loss, and noise. However, the impacts would be minor and localized, and no population-level impacts are anticipated. Impacts would be less than Alternative 1 because the Digital Multipurpose Training Range is not part of Alternative 2. Tribal hunting and gathering does not currently take place at NWSTF Boardman, and this would not change. Alternative 2 would not result in significant impacts on American Indian traditional resources.

3.12 PUBLIC HEALTH AND SAFETY AND PROTECTION OF CHILDREN

3.12.1 INTRODUCTION

3.12.1.1 Definition

Public health and safety issues are defined as those elements of the Proposed Action that directly affect the health and safety of the public in the areas adjacent to Naval Weapons Systems Training Facility (NWSTF) Boardman. The United States (U.S.) Department of the Navy's (Navy's) policy is to use every possible precaution in planning and executing all activities in order to prevent injury to people or damage to property. Training hazards and associated safety procedures are analyzed in detail for an accurate assessment of public health and safety (Chief of Naval Operations Instruction [OPNAVINST] 3770.2K, and Military Handbook 1027/3B). Public safety or health concerns are minimized due to these precautions and because the public normally does not have access to Navy-controlled areas.

Proposed Action impacts that directly affect an individual's health or safety are considered in this assessment. Also, concerns that affect single individuals and isolated incidents may not rise to the level of a public health or public safety issue. Thus, the resource to be evaluated for Proposed Action effects is the collective health and safety of groups of individuals, especially children, in the areas adjacent to NWSTF Boardman training areas.

Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* focuses on environmental health risks and safety risks that may affect children. This EO was prompted by the recognition that children are more sensitive than adults to adverse environmental health and safety risks because they are still undergoing physiological growth and development. Analysis for EO 13045 requires assessment of readily available information regarding demographic data on the local, regional, and national populations, and, in particular, children less than 18 years old to evaluate the number and distribution of children in the region and whether these children are exposed to environmental health and safety risks from the Proposed Action. Information to support this analysis is derived from the U.S. Census Bureau (U.S. Census Bureau 2000 and U.S. Census Bureau 2010) and identified locations with potentially high concentrations of children, such as schools.

3.12.1.2 Regional Setting

All military training activities at NWSTF Boardman occur either on the ground, in the air, or a combination of both. Ground training activities occur at NWSTF Boardman approximately 2.5 miles (mi.) (4 kilometers [km]) south of the City of Boardman in Morrow County, Oregon. The surrounding areas are composed of agricultural lands and undeveloped areas. NWSTF Boardman is composed of Special Use Airspace (SUA) and Navy-controlled lands. Special Use Airspace has defined vertical and lateral limits established by the Federal Aviation Administration to segregate air activities that may be hazardous to non-participating aircraft.

3.12.1.3 Region of Influence

The Region of Influence for public health and safety concerns includes the entire NWSTF Boardman (including both SUA and Navy-controlled lands) and the immediately adjacent lands. Areas of heightened sensitivity to public health and safety concerns within the region of influence include areas where large groups of people may gather.

3.12.1.4 Determination of Significance

Factors used to assess the significance of potential impacts from military readiness activities at NWSTF Boardman include the extent or degree to which an alternative would have a serious negative impact on public health or disproportionate environmental health and safety risks specific to children. Types of activities that could pose a risk to public health are those in which hazardous constituents are released to the environment in substantial amounts, or in which hazardous levels of energy are released. Types of activities that raise public safety concerns are those where members of the public are proximate or within the footprint of a potentially hazardous training activity. Land detonations of explosives in a controlled training environment on Navy property, where a substantial buffer exists between the training site and adjacent public areas (i.e., outside of a Surface Danger Zone [SDZ] or Weapons Danger Zone [WDZ]), are deemed not to constitute a risk to public safety (see Figure 2-11).

3.12.2 AFFECTED ENVIRONMENT

3.12.2.1 Hazards Overview

3.12.2.1.1 Electromagnetic Radiation

Communications and electronic devices such as radar, electronic jammers, and other radio transmitters produce electromagnetic radiation. Any equipment that produces an electromagnetic field (e.g., televisions, radios, cellphones, radar, etc.) has the potential to generate hazardous levels of electromagnetic radiation. An electromagnetic radiation hazard exists when transmitting equipment generates electromagnetic fields that induce currents strong enough or voltages high enough to trigger explosive devices in munitions, to directly harm people or wildlife, or to create sparks that can ignite flammable substances. Hazards are reduced or eliminated by establishing minimum distances between electromagnetic radiation transmitters and people, munitions, and fuels.

Hazards of electromagnetic radiation to personnel, hazards of electromagnetic radiation to munitions, and hazards of electromagnetic radiation to fuel have been determined for electromagnetic radiation sources, based on their operating frequency and power output. The Navy follows OPNAVINST 5100.23G, Navy Safety and Occupational Health (SOH) Program Manual, of July 21, 2011 (hereinafter referred to as OPNAVINST 5100.23G) for its radiation protection requirements and safety guidelines. OPNAVINST 5100.23G follows the Institute of Electrical and Electronics Engineers (IEEE) C95.1a-2010, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kilohertz (kHz) to 300 gigahertz (GHz),” as amended March 16, 2010. There are two surface-to-air transmitters located on NWSTF Boardman in support of the Electronic Warfare events, which have a Radiation Hazard Zone of 5 feet (ft.) (1.5 meters [m]). The transmitters are positioned as to not allow the Radiation Hazard Zone to extend beyond the property of the facility. No other known hazards to personnel, munitions, or fuel exist at NWSTF Boardman from electromagnetic radiation, and there are no hazards to the public in off-site areas; therefore, this issue will not be addressed further in this Environmental Impact Statement.

3.12.2.1.2 Hazardous Materials and Wastes

Personnel at NWSTF Boardman use small quantities of hazardous materials at the administrative offices. These materials typically consist of various petroleum, oils, lubricants, compressed gases, and office supplies (e.g., toner, cleaning supplies). The small amount of hazardous waste generated at NWSTF Boardman comes from routine operations at support facilities (building, vehicle, and equipment maintenance), rather than directly from operations on the range itself. Typically, NWSTF Boardman generates waste only when a specific project, such as painting, is conducted.

In 1997, the United States Environmental Protection Agency (USEPA) published its Final Military Munitions Rule (MMR) (40 Code of Federal Regulations [C.F.R.] § 266.200–206). The MMR identifies when conventional and chemical military munitions become hazardous wastes under Resource Conservation and Recovery Act (RCRA), and provides for their safe storage and transport. Under the MMR, military munitions include, but are not limited to, the following items:

- Confined gaseous, liquid, and solid propellants;
- Explosives;
- Pyrotechnics;
- Chemical and riot agents; and
- Smoke canisters.

The MMR defines training; research, development, test, and evaluation (RDT&E); and clearance of unexploded ordnance and munitions fragments on active or inactive ranges as normal uses of the product. When military munitions are used for their intended purpose, they are not considered to be a solid waste for regulatory purposes and are not considered hazardous waste.

3.12.2.1.3 Training Munitions

Explosives (not high explosive), pyrotechnic devices, and other munitions used for training are transported to NWSTF Boardman either from Naval Air Station (NAS) Whidbey Island, Umatilla Chemical Depot, or other sites outside the area, and used in accordance with Navy and Oregon National Guard standard operating procedures. Ammunition is transported to the site and stored temporarily until use. Twenty-four-hour security for stored ammunition is provided by an advance party from the attending Oregon National Guard unit, in accordance with Army Regulation 190-11 *Physical Security of Arms, Ammunition, and Explosives* (U.S. Army 2013). The types and amounts of explosive materials that may be stored at a single location are determined by the quantity-distance requirements established by the Department of Defense (DoD) Explosives Safety Board. Explosive Safety Quantity Distance arcs determine the minimum safe separation between munitions storage areas and habitable structures.

3.12.2.1.4 Lasers

Laser-guided training rounds are also dropped during training at NWSTF Boardman. These training rounds are non-explosive missile-shaped rounds that are released by the attacking aircraft and guided into the target by an “eye-safe” laser that is emitted from the aircraft. An air-to-ground bombing exercise can also include the use of lasers by ground units to simulate, identify, or mark targets for attack by aircraft. The hazard zone for laser spotting is contained within Navy-administered land on NWSTF Boardman. Standard operating procedures are implemented to protect the public from operational hazards related to laser spotting. All laser use areas undergo a command review to ensure safety of personnel and the public. Prior to use of a proposed laser area, a certified laser system safety officer surveys the area to ensure compliance with all applicable rules and regulations governing laser use. The procedures developed for an area are reviewed annually, and the area is resurveyed every three years to ensure the area remains in compliance. Lasers are not used under conditions that would affect the beam, such as in the presence of standing water or snow. The NWSTF Boardman current laser certification has lapsed; however, recertification will occur prior to any new use of the range.

3.12.2.1.5 Aircraft Accident Potential

Aircraft supporting NWSTF Boardman training operate out of NAS Whidbey Island, National Guard locations, and from within NWSTF Boardman as well (Unmanned Aircraft System [UAS] launched on site). Aircraft fly to and from NWSTF Boardman following Federal Aviation Administration (FAA) regulations and enter the airspace according to instructions from the controlling agency, Seattle Air Route Traffic Control Center (ARTCC). Additionally, during exercises, pilots typically avoid towns, noise-sensitive areas, and wilderness areas at prescribed vertical or horizontal distances. During flights, pilots avoid areas where obstructions to air navigation have been identified. UASs follow the same safety regulations as aircraft, but do not presently carry weapons at NWSTF Boardman. Additionally, if a UAS loses radio or other contact, it is designed to circle in place until it can reacquire the signal. If it cannot, it is preprogrammed to return to a specific point.

Guidelines for establishing aviation safety zones around helicopter landing zones (LZs) are identified in NAVFAC P-80.3, and include clear zones and Accident Potential Zones (APZs). Infrequent helicopter activities—such as at NWSTF Boardman—require designation of a clear zone, but not APZs. The clear zone for Visual Flight Rule (VFR) aircraft is the same as the takeoff safety zone. The takeoff safety zone constitutes the area under the approach/departure surface until that surface is 50–100 ft. (15.24–30.48 m) above the landing zone elevation; this zone must be free of obstructions.

3.12.2.1.6 Surface Danger Zone

A SDZ is the mathematically predicted, three-dimensional area that a projectile or fragment could travel through and impact the earth, either by direct fire or ricochet. A SDZ is calculated using procedures found in Department of the Army Pamphlet 385-63 *Range Safety.* Except for areas on the ranges themselves, none of the SDZ areas would be disturbed during construction. A SDZ serves only as a human safety buffer downrange from a firing point and it must be controlled by the training unit.

3.12.2.1.7 Weapons Danger Zone

A WDZ encompasses the ground and airspace for lateral and vertical containment of projectiles, fragments, debris, and components resulting from the firing, launching, and/or detonation of aviation delivered munitions. This three-dimensional zone accounts for weapons accuracy, failures, and ricochets based on weapon type delivered by a specific aircraft type. WDZs represent the minimum safety requirements designed for aviation weapons training on Department of Defense ranges, and it must be controlled by the training unit.

3.12.2.1.8 Public Access and Proximity

Public access to NWSTF Boardman is controlled per NASWHIDBEYINST 8020.8 Ground Entry/Access to NWSTF Boardman. The control of public access is for security reasons, and to safeguard against potential hazards associated with military activities, and is accomplished through the use of fences and posted signs at NWSTF Boardman. Due to the fences and posted signs installed on the boundaries of NWSTF Boardman and the distance an individual would have to walk to the proposed training ranges, it is not expected for individuals to wander onto the proposed new training ranges from the city of Boardman and other surrounding areas. Occasional trespassers have been observed on NWSTF Boardman and reported to the appropriate authorities. Standard operating procedures require that the Range Safety Officer ensure that a range and the associated SDZ is clear of trespassers prior to the commencement of training activities. The control of public access to NWSTF Boardman training areas is for safety concerns—to protect the public from harm. Additionally, the ranges on NWSTF Boardman are positioned away from the City of Boardman and they are located at least 3 mi. (4.83 km) into the property.

3.12.2.2 Protection of Children

EO 13045 requires assessment of readily available information regarding demographic data on the local, regional, and national populations of children. Children are defined as individuals less than 18 years of age for the purposes of this assessment. Demographic data is derived from the U.S. Census Bureau (U.S. Census Bureau 2000 and U.S. Census Bureau 2010) and locations with potentially high concentrations of children, such as schools, are identified.

Children are not expected to wander onto NWSTF Boardman from the City of Boardman due to fences and posted signs installed on the boundaries and the distance children would have to walk to the proposed training ranges. During operation of the training ranges, Range Control safety personnel ensure that there are no people forward of the firing line or in the target areas.

3.12.2.2.1 Population of Children

Table 3.12-1 depicts the percentage of population less than 18 years of age and the average family size for the city, county, state, and nation, as well as for the two adjoining counties that underlie the NWSTF Boardman Military Operations Area (MOA), Gilliam and Umatilla. The City of Boardman's population of children is slightly higher compared to county, state, or national populations. Areas within the City of Boardman with higher concentrations of children are addressed in the following subsection.

3.12.2.2.2 Schools

According to the Morrow County School District, approximately 1,000 students are enrolled in elementary, middle and high schools in the City of Boardman. Schools located within the region of influence (as defined by the maximum extent of noise impacts; see Section 3.4, Noise) include the following public schools: Sam Boardman Elementary School, Windy River Elementary School, and Riverside Junior/Senior High School.

Of these schools, Sam Boardman and Windy River Elementary Schools are located closest to NWSTF Boardman. These schools are located approximately 1.5 mi. (2.4 km) north of the northern border of NWSTF Boardman.

Table 3.12-1: Population of Children in the NWSTF Boardman Region of Influence

	Census Year	City of Boardman	Morrow County	Gilliam County	Umatilla County	Oregon	United States
Population	2000[1]	2,855	10,995	1,915	70,548	3,421,399	281,421,906
	2010[2]	3,220	11,173	1,871	75,889	3,831,074	308,745,538
Population less than 18 years of age (%)	2000[1]	38.1%	30.8%	23.2%	27.8%	24.7%	25.7%
	2010[2]	35.1%	28.5%	18.8%	26.6%	22.6%	24.1%
Average family size	2000[1]	3.66	3.28	2.85	3.14	3.02	3.14
	2010[2]	3.70	3.25	2.74	3.17	3.00	3.14

[1] U.S. Census Bureau (2000)
[2] U.S. Census Bureau (2010)

3.12.2.3 Range Sustainability Environmental Program Assessment

The migration of hazardous substances off military ranges can pose a risk to public health. The Navy's Range Sustainment Program is designed to ensure that Navy ranges remain operational while still protecting human health and the environment for nearby communities during training. The Range Sustainability Environmental Program Assessment (RSEPA) process is designed to assess environmental impacts of testing and training operations and to implement measures to protect the environment when needed. RSEPA was developed in response to a proactive Navy initiative, and is not driven by any federal or state regulatory requirements. The RSEPA assessment process can include up to three main steps, but not all ranges will require all three steps. There are decision points worked into the process to determine if more study or action is needed to ensure the protection of human health and the environment.

The three potential steps in RSEPA include the Range Condition Assessment (RCA), the Comprehensive Range Evaluation (CRE), and Sustainable Range Oversight. The RSEPA process is repeated every 5 years even if previous studies identified no potential off-site release of munitions constituents. The RCA is primarily an information gathering process to answer two questions: is the range in full compliance with environmental laws and policies and is there a threat of an off-range release of munitions constituents? A CRE is a detailed investigation of the range. A CRE is conducted if there is not enough information from the RCA to determine if munitions constituents could be moving off site, or if the RCA finds evidence that munitions constituents could potentially be moving off site. Most CREs involve sampling and they can include risk assessments. The sampling strategies are designed to examine only potential off-range releases of munitions constituents. The CRE sampling results are used to assess the potential for a release of munitions constituents off-range and determine if the potential off-range levels could pose a threat to human health or the environment.

If the CRE determines that munitions constituents are migrating off-range at levels that may pose safety concerns, the Navy will use a specified system of oversight known as Sustainable Range Oversight. This process addresses off range releases through environmental cleanup, informing regulators and the public throughout the process. Any off-range environmental clean-up that is needed will be conducted in accordance with the Navy's environmental restoration program and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Additionally, in accordance with the Emergency Planning and Community Right-to-Know Act, the storage and use of hazardous materials at NWSTF Boardman will be disclosed to emergency planning entities and emergency notifications will be issued if hazardous materials are released in amounts greater than defined under CERCLA.

Protective measures can be implemented at any point during the RSEPA process to ensure public safety, sustain range operations, and maintain environmental compliance. Some examples of protective measures may include relocating targets, posting warning signs or erecting fences, and modifying actual use of the range.

3.12.2.4 Army Operational Range Assessment Program

Similar to the Navy's RSEPA, the Army also engages in a program that ensures ranges remain operational while still protecting human health and the environment for nearby communities during training. The Operational Range Assessment Program (ORAP) process is designed to identify and evaluate potential off-range munitions constituents' impacts from operational ranges, assess environmental impacts of testing and training operations, and implement measures to protect the environment when needed. The ORAP was developed in response to DoD 4715.11, May 10, 2004, "Environmental and Explosives Safety Management on Operational Ranges Within the United States," and DoDI 4715.14, November 30, 2005, "Operational Range Assessments," and is not driven by any federal or state regulatory requirements. The ORAP process can include two main phases, but not all ranges will require both phases.

Phase I of the ORAP is a qualitative assessment of each range that uses existing information (e.g., firing records, environmental reports, public records, interviews, site visits) to reach one of three outcomes: unlikely (offsite migration is unlikely and the process is concluded), inconclusive (data gaps exists and more information is needed during a Phase II assessment), and referred (assessment shows migration is occurring at unacceptable levels and is referred to the Army's cleanup program).

The second phase (if needed due to an "inconclusive" outcome from Phase I) includes sampling to address data gaps, identify possibly migratory pathways, and compare contaminant levels to screening levels. If detections at or near range boundary are found above screening levels, then further study is conducted to determine if there is risk to human or ecological receptors. This information is used to reach one of two outcomes: unlikely (offsite migration is unlikely and the process is concluded) or referred (assessment shows migration is occurring at unacceptable levels and is referred to the Army's cleanup program).

Cleanup Programs authorized to perform off-range activities include Installation Restoration Programs or Military Munitions Response Program (which can use Defense Environmental Restoration Program funds for federally owned property), or Compliance Cleanup Programs (which address other areas [e.g., State-owned Army Reserve/National Guard ranges]. Immediate mitigation measures may be undertaken for munitions constituents that pose immediate threats to human health.

3.12.2.5 Current Requirements and Management Practices

There are specific and documented procedures in place to ensure that nonparticipants are not endangered by training actions. Medically trained personnel and first aid kits are on site for each training activity in the unlikely event of an injury. The presence of fences around NWSTF Boardman, and the use of gates and signs to control access, helps to protect the public from potentially hazardous training activities. Monitoring of training events serves to identify potential public health and safety risks and avoid them.

3.12.2.5.1 Range Planning and Control

Factors considered in evaluating the impact of the training on public safety include proximity of the activity to public areas; access control; schedule (time of day, day of week); frequency, duration, and intensity of activities; range safety procedures; operational control of hazardous activities or events; and safety history. Range users are instructed to discuss planned activities with the range scheduler to ensure that current and applicable range procedures are applied prior to conducting any activities.

Current range control procedures at NWSTF Boardman limit unanticipated interactions with the public. NWSTF Boardman areas are fully fenced; entrance into these areas is controlled by unmanned gates. Signs also are posted to warn the public of potentially hazardous activities. Trainers and exercise participants are responsible for assuring that nonparticipants are not close enough that they are at risk during all training activities.

3.12.2.5.2 Hazardous Materials and Wastes

NWSTF Boardman has a *Hazardous Control and Management Plan*, Authorized Use List, and a Hazard Communication Program. Material Safety Data Sheets are available for the hazardous materials stored there. Navy personnel at NWSTF Boardman receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials. NWSTF Boardman maintains a Conditionally Exempt Small Quantity Generator status for hazardous waste, and the facility is not required to have an Environmental Protection Agency Hazardous Waste Generator Identification number. Hazardous wastes are disposed of through local vendors (e.g., Safety Kleen provides a parts-cleaning service for vehicle maintenance). Some hazardous materials that are no longer needed at NWSTF Boardman are transported to NAS Whidbey Island for reassignment in compliance with the Hazardous Materials Transportation Act, U.S. Department of Transportation and Oregon Department of Transportation regulations. Some of these materials may be determined to be excess at that point and may then be generated as hazardous wastes, but this would occur at NAS Whidbey Island.

3.12.2.5.3 Unexploded Ordnance

Currently, users on the ground of NWSTF Boardman are made aware of unexploded ordnance hazards by signage warning of areas where unexploded ordnance clearance has not been confirmed as well as safety briefings provided prior to conducting activities on NWSTF Boardman.

3.12.3 Environmental Consequences

Public health and safety is an interdisciplinary issue—aspects of which are intertwined with other environmental topics. Hazardous air pollutants are addressed in Section 3.2 (Air Quality), in accordance with the Clean Air Act's National Emissions Standards for Hazardous Air Pollutants regulations. Human annoyance and the potential for hearing loss from training noise are addressed in Section 3.4 (Noise). Transportation of project personnel on public roads is addressed in Section 3.9 (Transportation). The remaining public health and safety issues are addressed in this section.

This resource section focuses on groups of activities that could pose a credible risk to public health and safety. Similar types of activities are grouped together for ease of analysis. Types of activities that could pose a risk to public health are those in which hazardous constituents are released to the environment in substantial amounts, or in which hazardous levels of energy are released. Types of activities that raise public safety concerns are those where members of the public are proximate or within the footprint of a potentially hazardous training activity. Land detonations of explosives in a controlled training environment on Navy property, where a substantial buffer exists between the training site and adjacent public areas (i.e., outside of a SDZ or WDZ), are deemed not to constitute a risk to public safety (see Figure 2-11).

3.12.3.1 Approach to Analysis

Training activities are considered to have a significant impact on public health or safety if the general public is substantially endangered. Most of the training activities consist of individuals, vehicles, and equipment stationed at or moving within NWSTF Boardman. Those activities that take place wholly within Navy-controlled areas have little potential to affect public safety in the absence of unauthorized public access. Some activities take place within NWSTF Boardman and are designed to be wholly contained therein, but have some potential to project secondary effects outside of NWSTF Boardman. For each training activity or group of similar activities, risks to the public are estimated, taking into consideration current safety procedures for range activities.

3.12.3.2 No Action Alternative

3.12.3.2.1 Land Activities

NWSTF Boardman training activities use live ammunition, such as small- and non-exploding medium-caliber rounds, and non-explosive practice bombs (see Table 2-2). Activities utilizing live ammunition do not project hazardous effects off site because of their size, and because safety zones are established specifically to control these effects. Routine training activities conducted within NWSTF Boardman pose little risk to public health or safety outside of the training areas. All live ammunition to be utilized in training activities on NWSTF Boardman would be transported to the site at the time of training and removed from the site following completion of training exercises. Transportation and storage of training materials in accordance with federal, state, and Navy requirements pose no substantial risk to public safety.

Training activities at NWSTF Boardman take place in well-defined locations under the close supervision of experienced military personnel. The same policies and procedures that protect training participants from injury or adverse health exposures would protect members of the public who were inadvertently present in the vicinity. However, trainers and exercise participants watch for the approach of nonparticipants, and respond accordingly; thus, no significant impacts to public safety are expected under the No Action Alternative.

3.12.3.2.2 Air Activities

Air activities under the No Action Alternative include the use of fixed-wing aircraft, helicopters, and UAS, which are involved in approximately 1,815 sorties per year (see Table 2-4). Aircraft supporting NWSTF Boardman training operate out of NAS Whidbey Island. Transit routes are typically military training routes, substantially reducing the risk to the general public in the event of an accident. Aircraft participate in the Air Warfare, Strike Warfare, Electronic Warfare, and Support Activities and conduct airborne operations. During these exercises, pilots would typically avoid towns, noise-sensitive areas, and wilderness areas at prescribed vertical or horizontal distances. In areas with wind turbine development, there may be increased safety risks due to additional structures in the area. However, these areas are not in heavily populated areas and would therefore not pose an increased risk to public health and safety. Given the use of military training routes and the avoidance of flights over public areas, aircraft activities associated with the No Action Alternative would have no significant impacts on public safety.

3.12.3.2.3 Protection of Children

Based on the analysis presented in this Environmental Impact Statement on Air Quality, Water Resources, and Noise associated with the No Action Alternative, the following conclusions are presented in regard to human health and environmental effects to children:

- Air Quality (Section 3.2) – Air emissions do occur from the No Action Alternative but do not pose human health or environmental risks as emissions are within or below historical or desired air quality conditions, and therefore do not pose environmental health risks to children that may disproportionately affect children, as all surrounding communities are affected by air emissions from this action.
- Water Quality (Section 3.3) – There is little chance for an incidental spill to reach groundwater if one were to occur based on the response procedures in place and the small quantities of materials and wastes used and generated at NWSTF Boardman. Non-explosive practice munitions would have negligible effects on groundwater under the No Action Alternative because potential contaminants are not expected to migrate to groundwater. Domestic wastewater would continue to be treated by a septic system serving the Administrative Area. Based on the limited full time presence at NWSTF Boardman (approximately six personnel), loadings to the system would be low and the effects to groundwater under the No Action

Alternative would be negligible. While current groundwater usage data are not available for NWSTF Boardman, use is limited based on the limited number of full time personnel and the limited needs to support training. Because water discharges do not have significant impacts to the local water resources at NWSTF Boardman, they do not pose environmental health risks to children that may disproportionately affect children.

- Noise (Section 3.4) – Primary sources of sound at NWSTF include aircraft (fixed-wing and helicopters) and weapons firing. Concerns related to noise from the No Action Alternative on the surrounding communities include hearing loss, non-auditory health effects, and speech interference/temporary attention. Based on the distribution and magnitude of noise impacts under the No Action Alternative, surrounding communities are slightly affected by training noise; however, lands adjacent to NWSTF Boardman that are primarily exposed to training activity noise are not heavily populated and do not contain sensitive noise receptors. Further, no schools are located in areas where the sound levels are greater than 65 A-weighted decibels (dBA) Day Night Level (DNL), which is the criterion for compatibility. Therefore, noise impacts do not pose environmental health risks to children that may disproportionately affect children.

There would be no significant impacts to the health and safety of children from the No Action Alternative, as children would not have direct access to the range due to fences and posted signs installed on the boundaries and the considerable distance children would have to walk to get onto the proposed training ranges. Additionally, the No Action Alternative would not pose environmental health risks that may disproportionately affect children.

3.12.3.3 Alternative 1

3.12.3.3.1 Land Activities

Under Alternative 1, the proximity of public areas to training activities and the potential for unauthorized nonparticipants to be in the vicinity of a training exercise would remain unchanged. Under Alternative 1, training activities would increase. However, the Navy would continue to implement Range Control Coordination Procedures and the Guard would implement ORAP to avoid public safety issues. NWSTF Boardman training activities under Alternative 1 use live ammunition, such as small- and medium-caliber rounds, mortar rounds, tank cannon rounds, missiles and high explosive charges (Explosive Ordnance Disposal [EOD] training only), and non-explosive practice bombs.

Additionally, under Alternative 1, range enhancements would be implemented including a Multipurpose Machine Gun Range and range operations control area, a DMPTR and range operations control area, Convoy Live Fire Range (CLFR) (eastern), a Demolition Training Range, and a Tactical Unmanned Aerial Systems training and maintenance facility and combined range operations control center. Munitions used yearly at the NWSTF Boardman Demolition Training Range would include two 200-pound (lb.) (90.7-kilograms [kg] shots, five 100 lb. (45.4 kg) shots, ten 50 lb. (22.7 kg) shots, twenty 25 lb. shots, and 13 shots under 25 lb. (11.3 kg). The daily maximum net explosive weight is not to exceed 200 lb. (90.7 kg). The WDZs and SDZs for these ranges are depicted in Figure 3.12-1 and Figure 3.12-2.

All construction activities would use typical construction equipment. Building materials, such as concrete and gravel, would likely be imported from one or more off-site sources. Staging for construction would be established within the Navy range operations compound. The transportation of materials and the construction activities would be in accordance with federal, state and Navy requirements and would not pose a substantial risk to public health or safety. Construction and operation of the training ranges, located in the potential presence of historical unexploded ordnance, would result in a small, but potentially significant, risk to the health and safety of individuals working and training on the ranges.

However, routine training activities conducted within NWSTF Boardman pose little risk to public health or safety outside of the training areas. Activities utilizing live ammunition do not project hazardous effects off site because of their size, and because safety zones have been established specifically to control these effects. Therefore, land activities under Alternative 1 would not significantly impact public health and safety.

3.12.3.3.2 Air Activities

Under Alternative 1, typical flight paths for Low-Altitude Tactical Training (LATT) would change their orientation as a result of the addition of SUA (Boardman Low MOA and Boardman MOA [Proposed Extension]) (Figure 3.12-3). Aircraft sorties (fixed-wing, rotary-wing, and UASs) would increase to about 3,470 from 1,815 in the No Action Alternative. Additional risks posed by these activities would be associated with increased aircraft overflights and munitions. Flights over public and private lands would be of short duration (with flights lasting 5-10 seconds at any point along the aircraft's flight path). Air operations would continue to be conducted in accordance with regulations for the use of aircraft targets, Restricted Areas, and MOAs/Air Traffic Control Assigned Airspace (ATCAA) scheduled by NAS Whidbey Island (NASWHIDBEY INSTRUCTION 3770.1).

Additional lands underneath the new MOA would experience aircraft overflights; however, these activities would still be conducted in compliance with NASWHIDBEY INSTRUCTION 3770.1. During training activities, pilots would typically avoid towns, noise-sensitive areas, and wilderness areas at prescribed vertical or horizontal distances. Non-military aircraft would be allowed to utilize the MOA during training activities; however, pilots will be vigilant to avoid any interactions. In areas with wind turbine development, there may be increased safety risks due to additional structures in the area. However, these areas are not in heavily populated areas and would therefore not pose an increased risk to public health and safety. Given the use of military training routes, vigilance by military pilots to avoid any obstructions or other planes, and the avoidance of flights over public areas, aircraft activities under Alternative 1 generally would have no significant impacts on public safety.

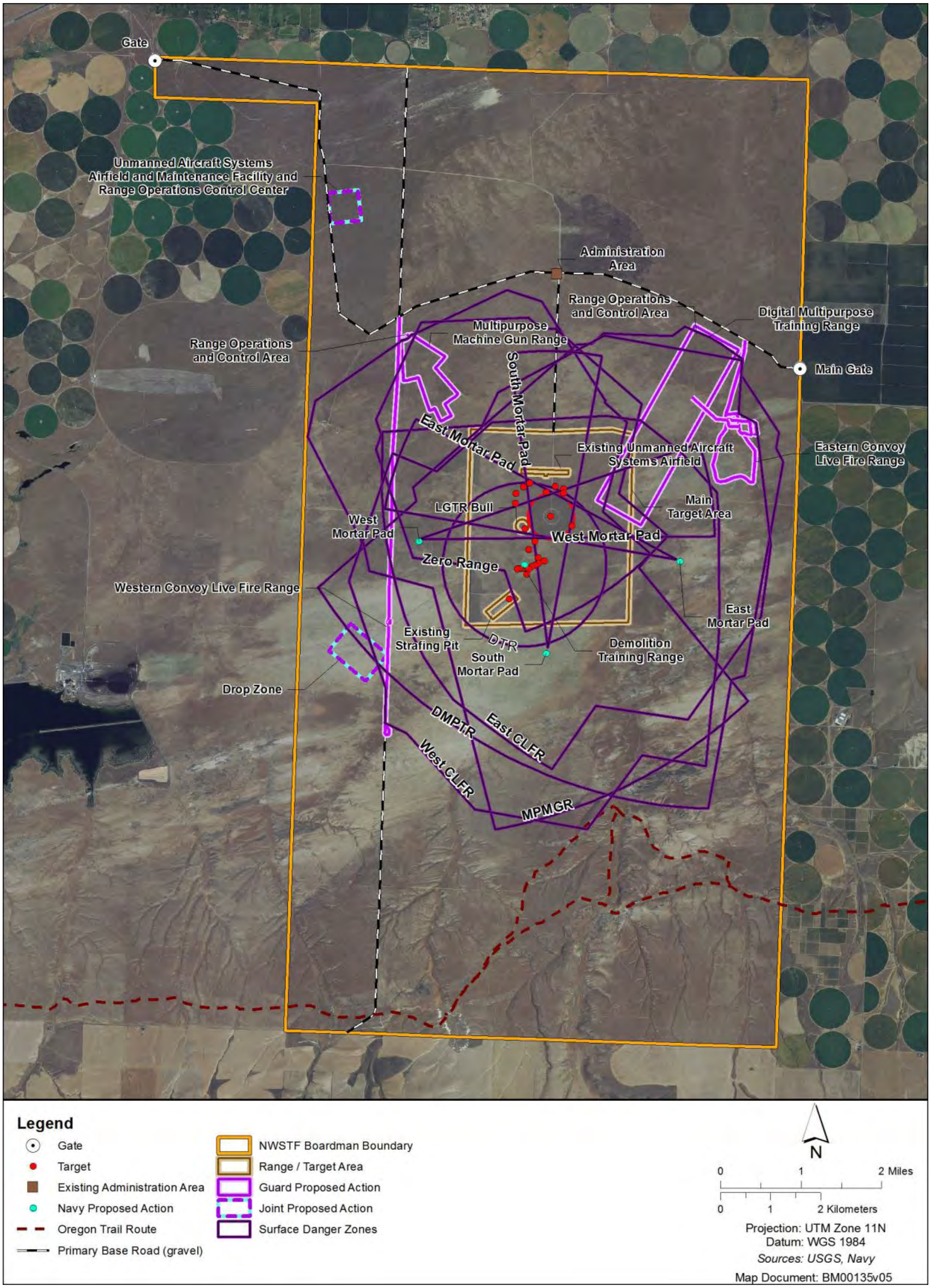


Figure 3.12-1: Surface Danger Zones

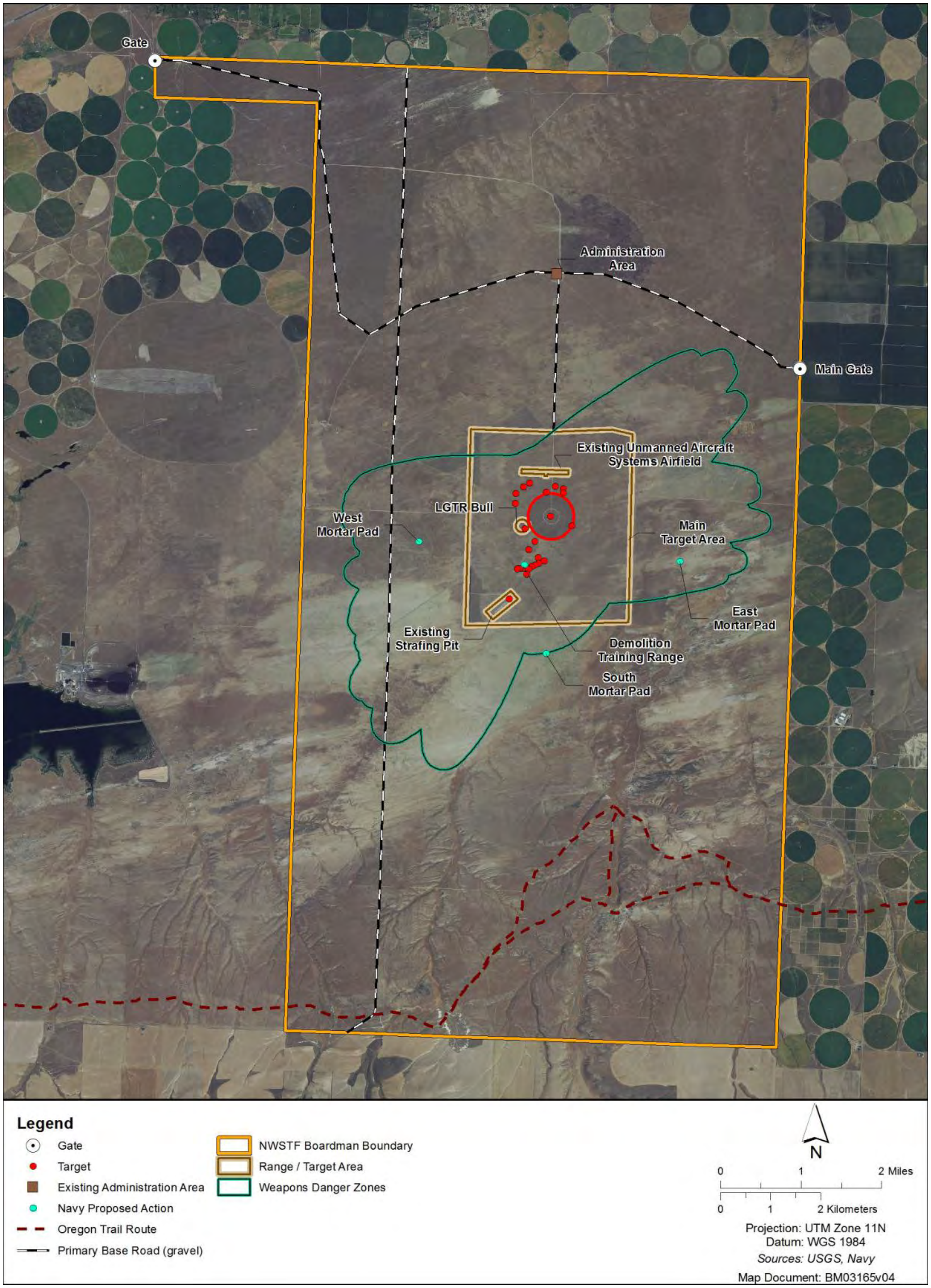
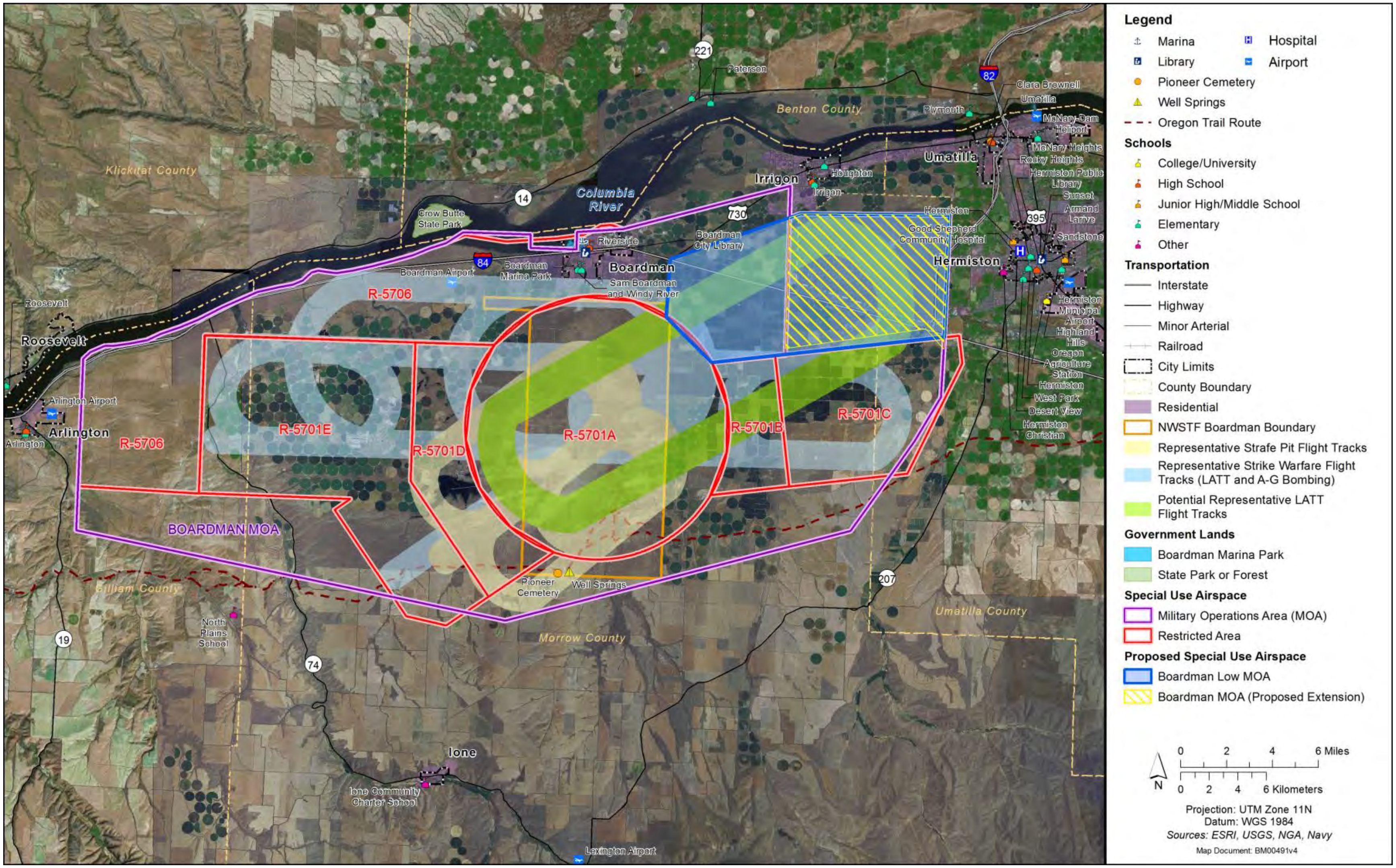


Figure 3.12-2: Weapons Danger Zones

1 

2 **Figure 3.12-3: Aircraft Flight Tracks Under Alternative 1 and 2 (Representative)**

3.12.3.3.3 Protection of Children

Based on the analysis presented herein on air quality, water resources, acoustics, and public health and safety associated with Alternative 1, the following conclusions are presented in regard to human health and environmental effects to children:

- Air Quality (Section 3.2) – Air emissions do occur from Alternative 1 but do not pose human health or environmental risks as the status of the air quality in the Eastern Oregon Intrastate Air Quality Control Region 191 would not be affected. Additionally, air emissions from Alternative 1 do not pose environmental health risks that may disproportionately affect children.
- Water Quality (Section 3.3) – There is little chance for an incidental spill to reach groundwater if one were to occur based on the response procedures in place and the small quantities of materials and wastes used and generated at NWSTF Boardman. Non-explosive practice munitions would have negligible effects on groundwater under Alternative 1 because potential contaminants are not expected to migrate to groundwater. Domestic wastewater would continue to be treated by a septic system serving the Administrative Area. Based on the limited full time presence at NWSTF Boardman (approximately six personnel), loadings to the system would be low and the effects to groundwater under Alternative 1 would be negligible. While current groundwater usage data are not available for NWSTF Boardman, use is low based on the small number of full-time personnel and the limited needs to support training. Because water discharges do not have significant impacts to the local water resources at NWSTF Boardman, they do not pose health or environmental risks to the surrounding communities. Therefore, water discharges do not pose environmental health risks that may disproportionately affect children.
- Noise (Section 3.4) – Primary sources of sound include aircraft (fixed-wing and helicopters) and weapons firing. Concerns related to noise from Alternative 1 on the surrounding communities would include hearing loss, non-auditory health effects, and speech interference/temporary attention. Low-level flights within the restricted airspace would generate much higher levels of sudden-onset pass-by aircraft sound, but few individuals would be close enough to the aircraft to hear such sounds, as these activities are limited to the restricted airspace, which occurs over areas with low densities of sensitive receptors. Based on the distribution and magnitude of noise impacts under Alternative 1, communities surrounding NWSTF Boardman and those located under the restricted airspace would continue to be slightly affected by training noise. Lands adjacent to NWSTF Boardman, as well as those underlying the new SUA, are exposed to training activity noise; however, they are sparsely populated as they are primarily agricultural or conservation land. Further, all the schools are compatible because none are located in areas where the sound levels are greater than 65 dBA DNL. The numbers of sensitive receptors in these regions are low; therefore, noise from Alternative 1 does not pose environmental health risk to children that may disproportionately affect children. Under Alternative 1, construction related noise would be short-term and negligible and would not attenuate beyond NWTSF Boardman boundaries.

Based on the analysis presented in Section 3.2 (Air Quality), Section 3.3 (Water Quality), and Section 3.4 (Noise) Alternative 1 does not pose environmental health risks that may disproportionately affect children.

3.12.3.4 Alternative 2

NWSTF Boardman training activities use live ammunition, such as small- and medium-caliber rounds, mortar rounds, high explosive charges (EOD training only), and non-explosive practice bombs. Activities utilizing live ammunition do not project hazardous effects off site because of their size, and because safety zones are established specifically to control these effects. Routine training activities conducted within NWSTF Boardman pose little risk to public health or safety outside of the training areas. Transportation and storage of energetic training materials would occur in accordance with applicable federal, state, and Navy requirements and would therefore pose no substantial risk to public safety.

3.12.3.4.1 Land Activities

Under Alternative 2, the proximity of public areas to training activities and the potential for unauthorized nonparticipants to be in the vicinity of a training exercise would remain unchanged. Under Alternative 2, military use of NWSTF Boardman for training would continue as discussed under the No Action Alternative, and operation of live-fire gunnery training ranges and associated support facilities would be added to the activities conducted on the installation as described for Alternative 1, with the exception being the Digital Multipurpose Training Range, which will not be constructed or operated under Alternative 2.

Alternative 2 also includes the addition of three mortar pads, a second CLFR, and a new joint-use range operations control center (separate building from the UAS Training and Maintenance Facility). All construction activities would use typical construction equipment. Building materials, such as concrete and gravel, would likely be imported from one or more off-site sources. Staging for construction would be established within the Navy range operations compound. The transportation of materials and the construction activities would be in accordance with applicable federal, state and Navy requirements and would not pose a substantial risk to public health or safety. Therefore, land activities under Alternative 2 would not significantly impact public health and safety.

3.12.3.4.2 Air Activities

Under Alternative 2, aircraft sorties (fixed-wing, rotary-wing, and unmanned aerial systems) would increase to about 3,470 from 1,815 in the No Action Alternative. Additional risks posed by these activities would be associated with increased aircraft overflights and munitions. Typical flight paths for LATT would change their orientation as a result of the addition of SUA (Boardman Low MOA and Boardman MOA [Proposed Extension]) (see Figure 3.12-3). The lands underneath the new MOA would experience aircraft overflights. However, similar to the No Action Alternative, flights over public and private lands would be of short duration (with flights lasting 5–10 seconds at any point along the aircraft's flight path). Air operations would continue to be conducted in accordance with regulations for the use of aircraft targets, Restricted Areas, and MOAs/ATCAA scheduled by NAS Whidbey Island (NASWHIDBEY INSTRUCTION 3770.1). During training activities, pilots would typically avoid towns, noise-sensitive areas, and wilderness areas at prescribed vertical or horizontal distances. Other aircraft would be allowed to utilize the MOA during training activities; however, pilots will be vigilant to avoid any interactions. In areas with wind turbine development, there may be increased safety risks due to additional structures in the area. However, these areas are not in heavily populated areas and would therefore not pose an increased risk to public health and safety.

Given the use of military training routes, vigilance by military pilots to avoid any obstructions or other planes, and the avoidance of flights over public areas, aircraft activities under Alternative 2 generally would have no significant impacts on public safety.

3.12.3.4.3 Protection of Children

Based on the analysis presented herein on air quality, water resources, acoustics, and public health and safety associated with Alternative 1, because Alternative 2 would have similar impacts, the following conclusions are presented in regard to human health and environmental effects to children for Alternative 2:

- Air Quality (Section 3.2) – Air emissions do occur from Alternative 2 but do not pose human health or environmental risks as the status of the air quality in the Eastern Oregon Intrastate Air Quality Control Region 191 would not be affected. Additionally, air emissions from this action do not pose environmental health risks to children that may disproportionately affect children.
- Water Quality (Section 3.3) – There is little chance for an incidental spill to reach groundwater if one were to occur based on the response procedures in place and the small quantities of materials and wastes used and generated at NWSTF Boardman. Non-explosive practice munitions would have negligible effects on groundwater under Alternative 2 because potential contaminants are not expected to migrate to groundwater. Domestic wastewater would continue to be treated by a septic system serving the Administrative Area. Based on the limited full time presence at NWSTF Boardman (approximately six personnel), loadings to the system would be low and the effects to groundwater under Alternative 2 would be negligible. While current groundwater usage data are not available for NWSTF Boardman, use is limited based on the limited number of full-time personnel and the limited needs to support training. Because water discharges do not have significant impacts to the local water resources at NWSTF Boardman, they do not pose health or environmental risks to the surrounding communities. Therefore, Alternative 2 does not pose environmental health risks to children that may disproportionately affect children.
- Noise (Section 3.4) – Major sources of sound includes aircraft (fixed-wing and helicopters) and weapons firing. Concerns related to noise from Alternative 2 on the surrounding communities would include hearing loss, non-auditory health effects, and speech interference/temporary attention. Low-level flights within the restricted airspace would generate much higher levels of sudden-onset pass-by aircraft sound, but few individuals would be close enough to the aircraft to hear such sounds, as these activities occur over areas with low densities of sensitive receptors. Based on the distribution and magnitude of noise impacts under Alternative 2, communities surrounding NWSTF Boardman and those located under the restricted airspace would continue to be slightly affected by training noise. Lands adjacent to NWSTF Boardman, as well as those underlying the new SUA, are exposed to training activity noise; however, they are sparsely populated as they are primarily agricultural or conservation land. Further, all the schools are compatible because none are located in areas where the sound levels are greater than 65 dBA DNL. The number of sensitive receptors in these regions is low; therefore, noise under Alternative 2 does not pose environmental health risks to children that may disproportionately affect children. Under Alternative 2, construction related noise would be short-term and negligible and would not attenuate beyond NWTSF Boardman boundaries.

Based on the analysis presented in Section 3.2 (Air Quality), Section 3.3 (Water Quality), and Section 3.4 (Noise) Alternative 2 does not pose environmental health risks to children that may disproportionately affect children.

3.12.3.5 Proposed Management Practices, Monitoring, and Mitigation Measures

3.12.3.5.1 Management Practices

Current measures in place to ensure that nonparticipants are not endangered by actions at NWSTF Boardman would continue (Section 3.12.2.5). The following management practices would be implemented to reduce hazards associated with unexploded ordnance: (1) post signs warning of areas where unexploded ordnance clearance has not been confirmed; and (2) after range development, restrict movement of Soldiers using the training range to designated areas that are known to be free of any unexploded ordnance. In addition, supplemental unexploded ordnance clearance operations would be conducted prior to construction of range enhancements and operation of the proposed training ranges.

3.12.3.5.2 Monitoring

No additional monitoring needs were identified for public health and safety.

3.12.3.5.3 Mitigation Measures

Mitigation measures for other resources that affect public health and safety (e.g., noise, air quality) would be implemented. No additional mitigation measures are warranted.

3.12.3.6 Summary of Effects and Conclusions

Table 3.12-2 summarizes the effects of and mitigation measures for the No Action Alternative, Alternative 1, and Alternative 2.

Table 3.12-2: Summary of Effects

Alternative	Effects
No Action Alternative	
Other Stressor Categories	
Air Activities	• Risks to the public from aircraft supporting NWSTF Boardman training is minimal, based on the use of military training routes, vigilance by military pilots to avoid any obstructions or other planes, and flight path avoidance of sensitive areas.
Land Activities	• Routine training activities conducted within NWSTF Boardman pose little risk to public health or safety outside of the training areas.
Impact Conclusion	• No significant impacts to public health and safety are expected. • No disproportionate environmental health and safety risks specific to children are expected under the No Action Alternative.

Table 3.12-2: Summary of Effects (continued)

Alternative	Effects
Alternative 1	
Other Stressor Categories	
Air Activities	• Though exercises involving aircraft would increase, public safety would be maintained.
Land Activities	• On-site training activities would increase. The Navy would continue to implement Range Control Coordination and RSEPA procedures, and the Guard would implement the ORAP to avoid public safety issues. • Range enhancement construction activities would be conducted in accordance with legally applicable federal, state, and Navy regulations.
Impact Conclusion	• No significant impacts to public health and safety are expected. • No disproportionate environmental health and safety risks specific to children are expected under Alternative 1.
Alternative 2	
Other Stressor Categories	
Air Activities	• Though exercises involving aircraft would increase, public safety would be maintained.
Land Activities	• On-site training activities would increase. The Navy would continue to implement Range Control Coordination and RSEPA procedures, and the Guard would implement the ORAP to avoid public safety issues. • Range enhancement construction activities would be conducted in accordance with legally applicable federal, state, and Navy regulations.
Impact Conclusion	• No significant impacts to public health and safety are expected. • No disproportionate environmental health and safety risks specific to children are expected under Alternative 2.

Notes: NWSTF = Naval Weapons Systems Training Facility, Navy = United States Department of the Navy, ORAP = Operational Range Assessment Plan, RSEPA = Range Sustainability Environmental Program Assessment

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3.13 WILDFIRE

3.13.1 INTRODUCTION

Naval Weapons Systems Training Facility (NWSTF) Boardman has an extensive history with wildfires, though most documentation is from the last 10 years. Historically, the area was comprised of fire adapted habitats with fire return intervals from around 20 to 50 years. With the widespread introduction of invasive plant species and non-native annual grasses, the fuel loading of understory vegetation (how much fuel is available to burn) has greatly changed and fires now tend to be more frequent, more severe, and can be long-term and/or permanent habitat altering events. Due to the concerns regarding wildfire, and the frequency of fires in the region, the potential for wildfire as a result of military activities at NWSTF Boardman is addressed as its own resource category here.

There are three possible ways that NWSTF Boardman can experience uncontrolled fires: (1) fires originating on the installation from operational activities, (2) fires originating from lightning strikes, and (3) fires originating off installation from any source and migrating into the perimeter of the installation. Since 1998, more than 85 percent of NWSTF Boardman has been burned by wildfires, which have caused short- and long-term habitat alterations. Large fires swept portions of the installation in 1998 (17,514 acres [ac.] [7,088 hectares {ha}]), 2007 (11,664 ac. [4,720 ha]), 2008 (30,612 ac. [12,388 ha]), and 2015 (16,000 ac. [6,475 ha], not shown on map) while smaller areas burned in 2002 (1,639 ac. [663.3 ha]), 2009 (618 ac. [250.1 ha]), and 2013 (1,480 ac. [599 ha]). With the exception of the 2009 and 2013 fires, all of these fires were started by lightning strikes. The cause of the 2009 and 2013 fires are unknown (U.S. Department of the Navy 2010) and the source of the 2015 fire was composting hay pile west of Boardman that caught fire in stiff winds. A training-related fire occurred in 2011, but was quickly extinguished. The extent of the 1998, 2002, 2007, 2008, 2009, and 2013 fires are presented in Figure 3.13-1. Due to the concerns regarding wildfire, and the frequency of fires in the region, the potential for wildfire as a result of military activities at NWSTF Boardman is analyzed.

3.13.2 AFFECTED ENVIRONMENT

NWSTF Boardman is situated in the lower Columbia Basin, within the Columbia Plateau Ecoregion. The Columbia Plateau, which occupies about two-thirds of eastern Washington and extends into north central Oregon, is an arid sagebrush steppe (shrub-steppe) and grassland, surrounded on all sides by moister, predominantly forested, mountainous ecological regions (Thorson et al. 2003). The region experiences cool winters and hot summers, and the annual average precipitation is about 12 inches (30.5 centimeters). The period of vegetation green-up, from late winter into early summer, generally represents the period of lowest wildland fire risk. The period of highest wildland fire risk occurs during the months of July, August, and September of each year.

Shrub-steppe habitats are open grass-dominated communities and are usually found on loamy, wind-deposited (loess) soils. In the Columbia Plateau Ecoregion, shrub-steppe communities can be broadly divided into two elevational types. Within 10 miles (mi.) (16.1 kilometers [km]) of the Columbia River, sandy shrub-steppe communities occur on unstable, well-drained soils. These include grasslands dominated by needle-and-thread; shrub-steppe habitats dominated by bitterbrush and needle-and-thread grass or Indian rice grass; and sand dune communities characterized by sagebrush, bitterbrush, and western juniper. There is usually a component of bare ground or open sand present. Farther from the Columbia River, big sagebrush steppe communities include basin big sagebrush/needle-and-thread grass; basin wildrye and bluebunch wheatgrass steppe; and Wyoming sagebrush/bluebunch wheatgrass, which formerly occupied the low-elevation, loess uplands in the Columbia Plateau (Oregon Department of Fish and Wildlife 2006).

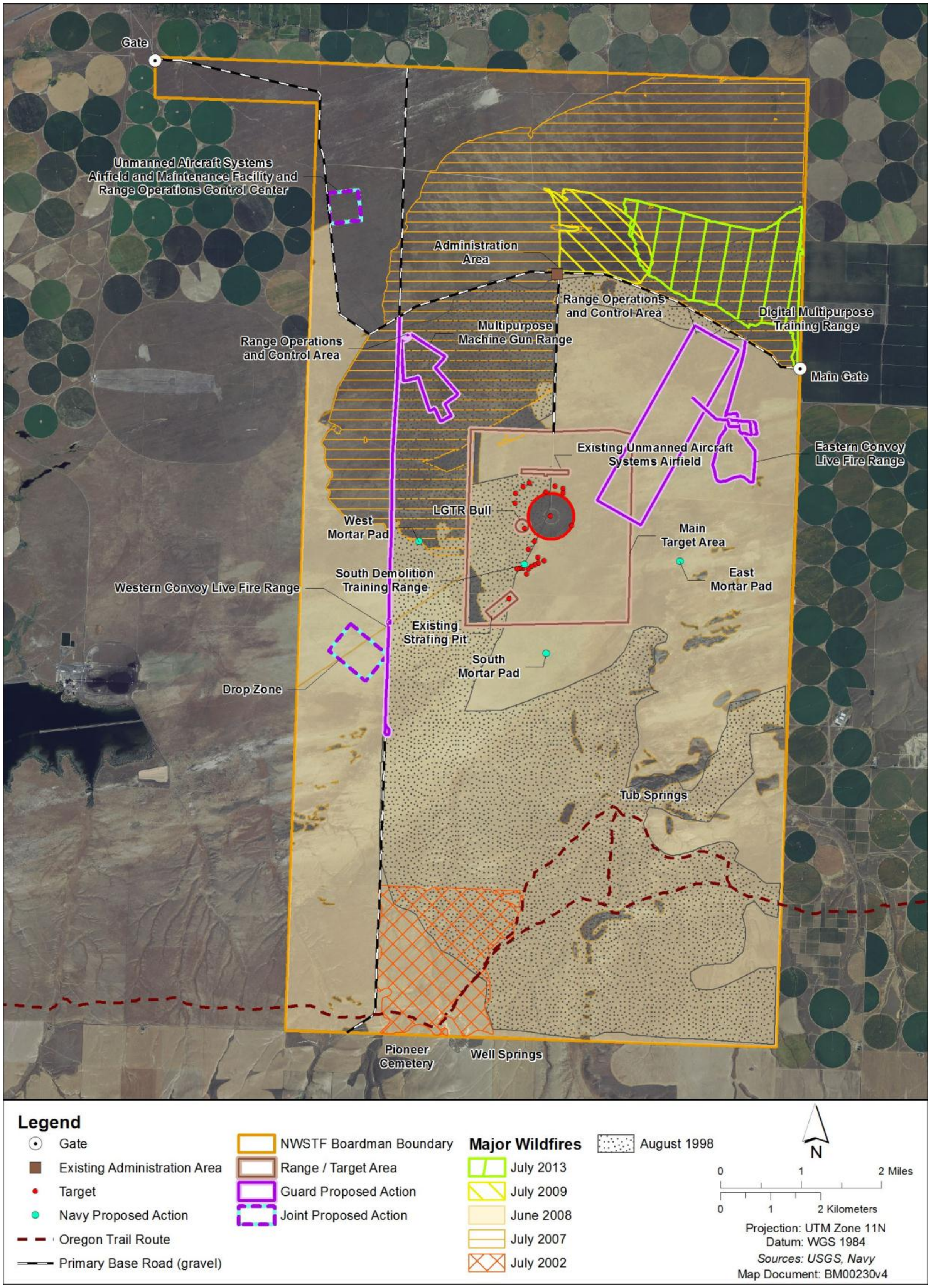

Figure 3.13-1: Extent of Major Wildfires at NWSTF Boardman

Fire intervals in juniper-steppe range from 32 to 70 years and sagebrush-steppe range from 10 to 40 years (Leenhouts 1998). At the Hanford National Monument located 60 mi. (96.6 km) north of NWSTF Boardman, the fire return interval for the shrub-steppe environment before human disturbances was 32–70 years (U.S. Fish and Wildlife Service 2008). A specific fire return interval for NWSTF Boardman before or after manmade disturbance is not known, although due to changes in vegetation over time from perennial to annual vegetation, it is inferred that the interval has decreased dramatically. In a pristine landscape, native bunchgrass vegetation maintains a patchy distribution across the landscape, allowing most fires to naturally extinguish themselves due to a lack of closely spaced fuel. Cheatgrass, a non-native annual, grows in the interstices of the bunchgrass, providing closely spaced fuel needed to maintain and spread fire. The result is that when fires occur, they spread more readily through cheatgrass and the fires can burn the same areas more frequently. Native bunchgrasses do not recolonize burned areas as quickly as cheatgrass and are outcompeted for space and soil moisture resources following a fire. Cheatgrass-dominated landscapes become susceptible to fires about two weeks earlier and remain susceptible about two months longer than native bunchgrass communities, and fires tend to occur more frequently and burn with greater intensity (Billings 1992, Knick 1999). In addition, sagebrush and antelope bitterbrush are highly susceptible to fire kill and rabbitbrush is susceptible to top kill. With the introduction of cheat grass to these shrub environments and a decreased fire return interval (less time in between fires), a shift from shrubland to grassland occurs. Changes to native vegetation on the facility are often a result of burn patterns by wildfires (U.S. Department of the Navy 2010), which in turn result in wildlife habitat changes on NWSTF Boardman.

A wildland-urban interface is a zone where man-made improvements intermix with wildland fuels. Morrow County, in its *Community Wildfire Protection Plan*, identified all of NWSTF Boardman as being within the County’s wildland-urban interface zone. The rationale for this decision is due to the value placed on the rural-urban development of the city of Boardman and on the agricultural developments, including structures, irrigation systems, and crops in the vicinity of NWSTF Boardman. The city of Boardman is located approximately 2 mi. (3.2 km) north of the NWSTF Boardman boundary. Between the city and the north boundary of NWSTF Boardman are agricultural lands. Agricultural lands also extend along the east and south borders of NWSTF Boardman. On the east boundary, for a distance of approximately 3 mi. (4.8 km), there is a hybrid tree plantation. To the west, there is a coal fired power generation station, an aviation research and development facility, a conservation area, agricultural and undeveloped land. Further west beyond the power generation station and aviation facility, there are extensive agricultural lands.

3.13.2.1 Wildfire Seasonality

Wildland fire on NWSTF Boardman can occur much of the year, depending on the proper mix of dead and live fuel, moisture, and weather conditions that may support fire ignition and subsequent wildland fire spread. Fire season in the area of the range can start as early as May and extend through September. In May through July, west winds with mid-level wind speeds of 5 to 9 miles per hour (mph) are common with temperatures in May around 75 to 80 degrees Fahrenheit (°F) (23.9 to 26.7 degrees Celsius [°C]) and climbing to around 90°F (32.2°C) in July. Relative humidity in these months ranges from 30 to 40 percent. In August and September, the winds shift to the south with higher mid-level wind speeds than occur in the earlier months along with higher temperatures and lower relative humidity. The routine summer thunderstorms which build over the mountains to the south of NWSTF Boardman indicate the instability of the summer atmosphere due to the solar radiation and high ground temperatures in the arid and semi-arid regions east of the Cascades. These thunder cells drift out from the mountains bringing strong gusty winds and lightning. In the past 10 years, lightning has been the ignition source for the largest wildland fires on NWSTF Boardman. Most lightning occurs in the months of August and September.

3.13.2.2 Response to Wildfires

Until 1996, NWSTF Boardman was staffed by 30 or more United States (U.S.) Department of the Navy (Navy) personnel who were wildland fire qualified and available to respond to wildfires of either natural or human causes. However, since the Navy has reduced their bombing activity, NWSTF Boardman staff has been reduced to six people. When the larger wildfires occurred in 1998 and 2002, Navy firefighting personnel available at the facility had no ability to control the fires beyond protecting existing Navy facilities and structures. Because of the staffing size (typically less than six personnel), firefighting becomes a matter of containment to smaller areas where either the installation personnel have a chance of extinguishing the fire, or where outside agencies may be able to help. This initial response force is critical as a first line of defense to contain a small fire and in providing initial efforts to prevent a wildland fire from spreading beyond the installation boundaries. The Naval Air Station (NAS) Whidbey Island Air Operations is responsible to maintain appropriate personnel and needed support equipment for initial wildland firefighting capability and maintaining existing fire breaks (Figure 3.13-2). NAS Whidbey Island funds the rental of a tractor during the peak fire season, used by assigned personnel to maintain existing fire/fuel breaks. The tractor is also used for the initial stages of wildland fire-suppression efforts.

3.13.2.3 Current Requirements and Management Practices

Commander, Navy Region Northwest (CNRNW) has implemented a regional Fire Management Plan. The Navy is currently revising, updating and expanding the specific portion of that plan applicable to NWSTF Boardman. The current fire strategy is to use the existing road system as the staging lines at which fires will be fought. The Navy currently maintains a system of 60-foot-wide fire breaks throughout NWSTF Boardman. A detachment of six Navy personnel is stationed at NWSTF Boardman. Their responsibilities are to maintain the buildings, roads, wells, fences, and other infrastructure and provide security in accordance with NASWHIDBEY Instruction 3120.6 (NWSTF Boardman Standard Operating Procedures). Navy personnel stationed at NWSTF Boardman are required to hold Wildland Firefighting Red Cards. Additionally, the Navy personnel stationed at NWSTF Boardman are equipped with appropriate wildland protective clothing. NWSTF Boardman firefighters have nine vehicles assigned to them; however, only three are used for actual firefighting operations, a dedicated firefighting vehicle (Type VI Brush truck), a GSA truck that has a 250-gallon firefighting skid unit mounted (a “skid” is a water pump with a large water capacity that sits in the rear of a flatbed truck), and a Model 19 fire engine (600-gallon tank). In addition, the Navy leases a tractor and disc during the four-month fire season to maintain fire/fuel breaks. In extreme situations, the tractor could also be used for incipient wildland fire-suppression efforts when the application of foam lines are unavailable, exhausted, or ineffective.

The Navy previously had a mutual aid agreement for wildland fire response with Umatilla Chemical Depot (UCD) fire department. However, the Depot completed its mission in late 2011 and was closed down through the Base Realignment and Closure process. The fire department responsibilities have been transferred to the Oregon Military Department, and a Mutual Aid Agreement was drafted and signed in 2013 and is effective through 2018.

According to the *CNRNW Fire Management Plan*, a risk management decision process should be established that will determine the need for special orders and closures for work/training during extreme fire conditions.

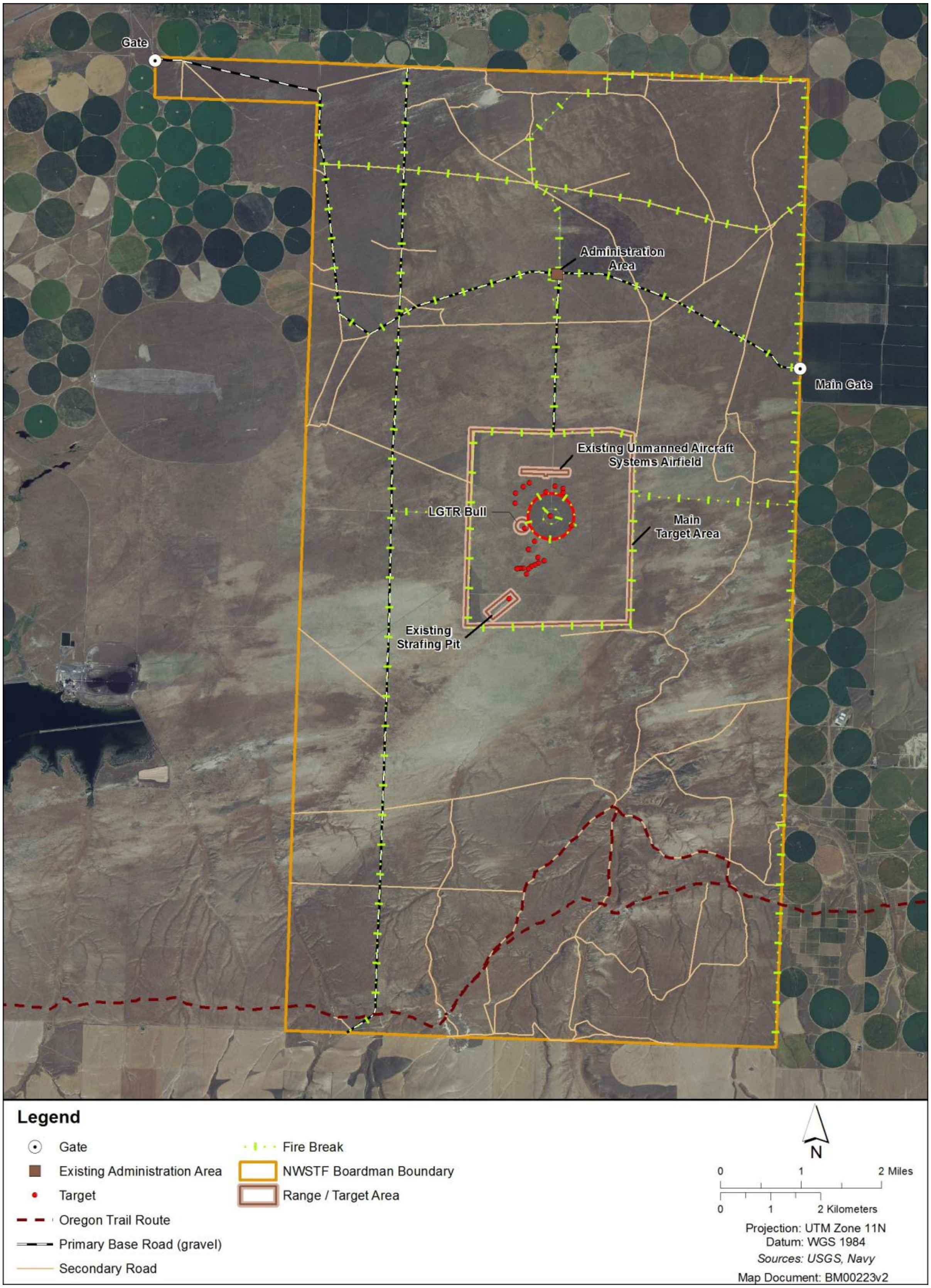

Figure 3.13-2: NWSTF Boardman Existing Fire Breaks

The goal of risk management is to safely sustain long-term military use and training activities over short-term work or training tasks. Planning and scheduling of appropriate training activities and matching supporting fire protection resources to the level of training activity during the fire season are possible tools to reduce and mitigate wildfire risk. The risk management decision process will consider: military work/training priorities and minimum requirements; fire weather and fuel conditions; appropriate management responses; availability of wildland firefighting resources; military, public, and community safety; and fire management zone priorities.

Oregon Revised Statutes (ORS) requires owners and operators of forestland to take appropriate action to control, extinguish, and report wildland fires regardless of origin (ORS §477.066). In addition, state law also indicates that the Oregon National Guard (ORNG) shall be subject to the duties, requirements or penalties of ORS §477.068 (Liability for cost of abatement), ORS §477.085 (Liability for cost of protecting land within a forest protection district) and ORS §477.090 (Civil liability), where the origin or subsequent spread of a fire was the direct result of training activity by the ORNG (ORS §477.095). For regulatory purposes, any undeveloped wildland is considered forestland, whether or not trees are present. In summary, the ORNG is liable for wildland fire control when the origin or subsequent spread of a fire was the direct result of training activity by the ORNG.

3.13.2.4 Determination of Significance

Potential direct impacts from wildfires include damage to biological and cultural resources and impairment of air quality. Indirect impacts from wildfires include increased soil erosion rates due to removal of vegetation from the land and reduced water quality from water running over land cleared by fire. Because it is possible for many fires to affect a relatively limited area (resulting in limited impacts), or for a wildfire to affect a large area (resulting in many impacts), the frequency of wildfires is not used as a means for assessing the impacts of wildfires. Instead, the potential for wildfire ignition is used as the criterion for assessing wildfire impacts. For example, the conduct of training activities that have a high probability of igniting wildfires, especially in protected ecological areas, could result in significant impacts on the environment..

3.13.3 Environmental Consequences

3.13.3.1 No Action Alternative

Under the No Action Alternative, the primary causes of ignition related to training activities would be target maintenance and non-explosive practice munitions impacting the ground surface within the Main Target Area. Spotting charge detonations used with practice munitions may ignite accidental fires. Ground vehicle traffic is very limited and occurs on the existing road network, thus reducing the potential for ignition from ground vehicles. The risk of wildland fires from munitions is proportional to the number of spotting charges detonated on NWSTF Boardman. However, spotters monitoring practice munitions impacts readily identify ignitions from spotting charges, which decreases the response times and increases suppression efforts of the small staff stationed at NWSTF Boardman. Range safety monitoring by participating military units allows for early detection of training-related fires and rapid response. Therefore, fires that start during training activities are typically contained to relatively small areas. Additionally, NWSTF Boardman has a mutual aid agreement with wildland fire response with the Oregon Military Department through 2018.

The potential for naturally caused fire continues to exist and the present limited ability to respond would persist in the foreseeable future. Large wildfires would continue to occur at NWSTF Boardman under the No Action Alternative. The effects would be widespread on NWSTF Boardman and could extend to surrounding properties in the case of a large wildfire (see Appendix H, *Draft NWSTF Boardman Integrated Wildland Fire Management Plan*). However, these effects are not expected to be related to or caused by training activities and are not considered in the analysis of significance under this Environmental Impact Statement.

A fire may alter valuable plant communities and wildlife habitats, and result in mortalities of individual animals. Fires also may encourage the establishment of non-native species that compete with native plants. The general pattern observed is a decrease in native sagebrush and other shrub cover accompanied by an increase in non-native cheatgrass cover. In turn, increased cheatgrass cover can decrease the fire return interval and increase fire intensity (U.S. Department of the Navy 2010).

Wildfires caused by military training activities at NWSTF Boardman would result in short- and long-term moderate effects to vegetation, wildlife, and air quality under the No Action Alternative. Depending on the area affected, the impacts from a wildland fire caused by training activities could have a significant impact on vegetation, wildlife, and air quality. However, with current training practices and the implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan*, the impacts from training activities would be reduced and localized.

3.13.3.2 Alternative 1

Under Alternative 1, fire originating on NWSTF Boardman could occur as a result of construction or training activities, such as the use of incendiary devices, tracer rounds, smoke grenades, a projectile striking a metal object and causing a spark, or from heat generated by mechanical equipment, vehicles, or weapons. Fires resulting from training activities would be expected to occur on the Digital Multipurpose Training Range (DMPTR), Multipurpose Machine Gun Range (MPMGR), Convoy Live Fire Range (CLFR), and the Demolition Training Range (DTR) under Alternative 1. Fires caused by lightning strikes would also continue to occur.

Though the construction or training activities at the DMPTR, MPMGR, CLFR, and DTR are expected to increase the potential for initiating a fire, these activities coincide with a marked increase in personnel involved in the training activities. The military personnel involved in training activities would monitor for fire at all times during range operations from observation towers and while on patrols. Post-operation fire monitoring training would be conducted by range operators while conducting range clearance duties. This increase in personnel would decrease response times and increase suppression efforts and assets to training-related ignitions. Additionally, the ORNG would have a trained, dedicated fire crew and a wildland fire truck on-site during weapons training during times of high fire risk. The ORNG also would have CH-47 or CH-60 helicopter with aerial firefighting capability available or a single-engine aerial tanker (SEAT) contracted to be available during high fire risk seasons. During live fire operations, the ORNG would typically have one Type VI Brush Truck, up to two Type VII or three Type VI Bush Trucks with water and WFFF (Foam) capability, two to six personnel with Red Card training, and one Lead Forest Officer/Fire Captain.

Further, the Navy has a CNRNW *Fire Management Plan*. The Navy is currently revising, updating and expanding the specific portion of that plan applicable to NWSTF Boardman. A summary of the measures contained therein are presented in Section 3.13.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures) and detailed in Appendix H (*Draft NWSTF Boardman Integrated Wildland Fire Management Plan*). Key elements focus on reducing and preventing fires by: (a) prohibiting the use of tracer ammunition during high fire risk periods; (b) requiring pyrotechnic devices, such as smoke grenades, to be used in metal containers during high fire risk periods; (c) keeping vehicles away from vegetation; (d) educating Soldiers regarding smoking, fire danger, procedures for fire reporting, and vehicle use; (e) quick identification, reporting, and response to new fires; (f) enforcing bans on smoking, off-highway vehicle use, and other high-fire risks; (g) conducting post-operation fire monitoring training by range operators while conducting range clearance duties; and (h) increasing firefighting personnel and equipment. Further, the Draft Wildland Fire Management Plan recommends that past agricultural-related fences that are no longer needed (internal to NWSTF Boardman's perimeter fence) be removed, which will reduce fuel loading and increase fire response. The plan also recommends the establishment, repair and maintenance of water storage capabilities. Finally, the plan recommends a modification to the fire break system. The NWSTF Boardman road system would continue to act as fire breaks; however, approximately 219.6 ac. of existing fire breaks will be no longer be maintained by disking, and will be re-vegetated to bunchgrass low-stature, low-fuel source plant community. The fire break system would also be modified with the addition of 19.2 ac. of new fire breaks. Figure 3.13-3 presents the recommended modifications to the NWSTF Boardman fire break system.

The proposed increases in training under Alternative 1 at NWSTF Boardman could increase the risk of wildfire. Any potential for short- or long-term negative effects to vegetation or wildlife from fires caused by constructing and operating the proposed training ranges on NWSTF Boardman would increase under Alternative 1. However, the area potentially burned by accidental fires is expected to be relatively small based on implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan* (Appendix H). Wildfires caused by military training activities at NWSTF Boardman could result in significant short- and long-term effects to vegetation, wildlife, and air quality under Alternative 1. However, with current training practices and the implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan*, which identifies assets and outlines prevention, detection, dispatch, suppression, communications, and reporting measures (Appendix H) these effects would be reduced and localized.

The potential for naturally caused fire continues to exist. Large wildfires would continue to occur at NWSTF Boardman under Alternative 1. The effects would be widespread on NWSTF Boardman and could extend to surrounding properties in the case of a large wildfire. However, these effects are not expected to be related to or caused by training activities. Additionally, the implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan* serves to reduce the risk of and prevent large wildfires.

3.13.3.3 Alternative 2

Under Alternative 2, fire originating on NWSTF Boardman could occur as a result of construction or training activities, such as the use of incendiary devices, tracer rounds, smoke grenades, a projectile striking a metal object and causing a spark, or from heat generated by mechanical equipment, vehicles, or weapons. Fires resulting from training activities would be expected to occur on the same ranges as described under Alternative 1 (with the exception of the DMPTR, which would not be constructed or operated under Alternative 2), as well as at the proposed second CLFR, and from training activities utilizing the proposed mortar firing points. Fires caused by lightning strikes would also continue to occur.

The proposed increases in training under Alternative 2 at NWSTF Boardman could increase the risk of wildfire. Any potential for short- or long-term negative effects to vegetation or wildlife from fires caused by military training activities on NWSTF Boardman from constructing and operating the proposed

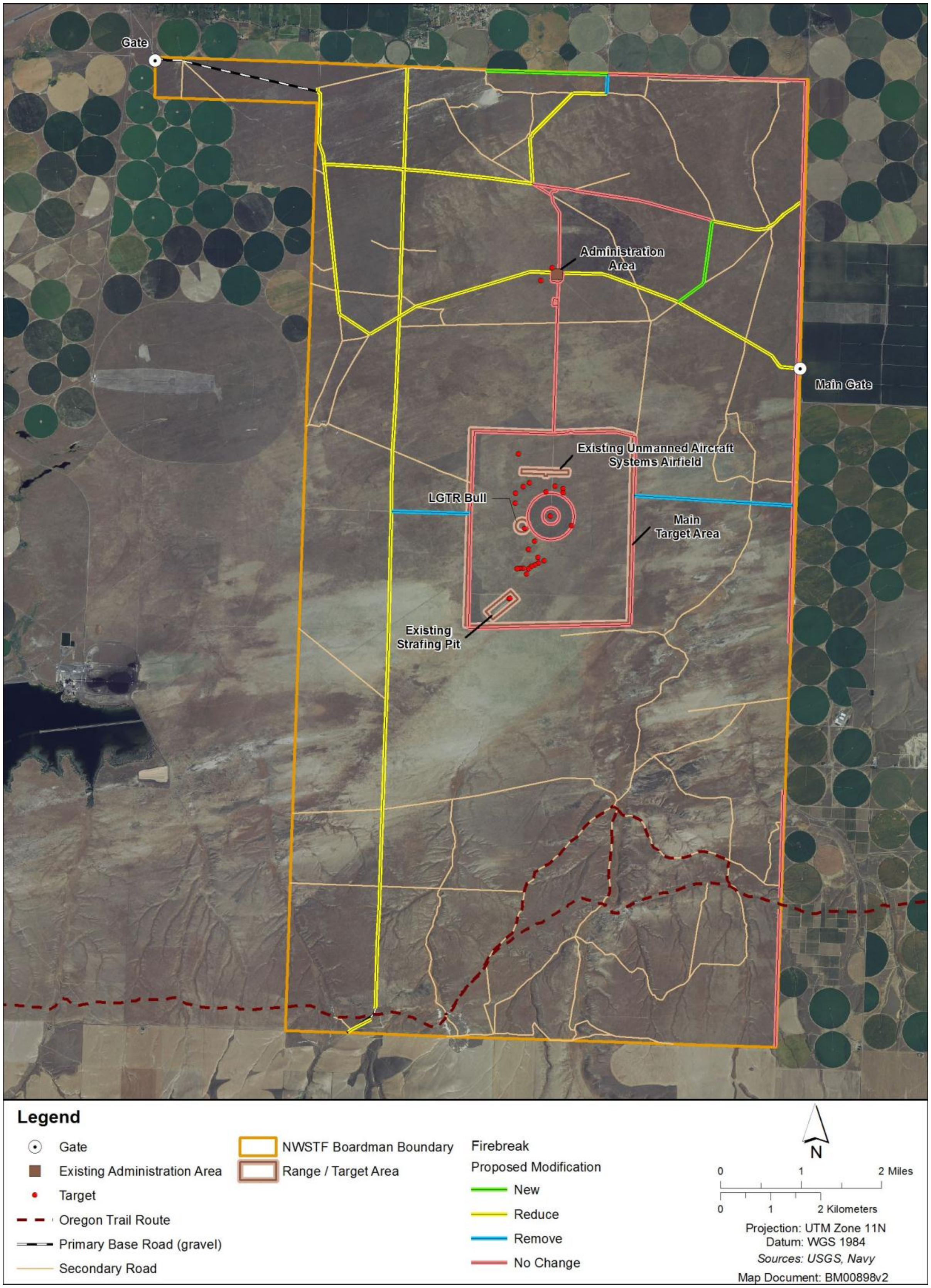

Figure 3.13-3: NSWTF Boardman Fire Break Modifications

training ranges would increase under Alternative 2. However, the area potentially burned by accidental fires is expected to be relatively small based on implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan*. Wildfires caused by military training activities at NWSTF Boardman could result in significant short- and long-term effects to vegetation, wildlife, and air quality under Alternative 2. However, with current training practices and the implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan*, which identifies assets and outlines prevention, detection, dispatch, suppression, communications, and reporting measures (Appendix H) these effects would be reduced and localized.The potential for naturally caused fire continues to exist. Large wildfires would continue to occur at NWSTF Boardman under Alternative 2. The effects would be widespread on NWSTF Boardman and could extend to surrounding properties in the case of a large wildfire. However, these effects are not expected to be related to or caused by training activities. Additionally, the implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan* serves to reduce the risk of and prevent large wildfires.

3.13.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.13.3.4.1 Management Practices

After an internal study, the Department of Defense (DoD) in 2001 signed and adopted standards contained within the Review and Update of the 1995 Federal Wildland Fire Management Policy. The Department of the Army subsequently issued its Army Wildland Fire Policy Guidance in 2002. The Army Wildland Fire Policy Guidance adopted the following policies and standards:

- Review and Update of the 1995 Federal Wildland Fire Management Policy (2001).
- National Wildfire Coordinating Group: PMS 310-1, Wildland Fire Qualification System Guide, June 2011 (or current version).
- National Fire Protection Association (NFPA): Standard 1051 – Standard for Wildland Fire Fighter Professional Qualifications, 2007 (or current version).
- NFPA: Standard 1143 – Standard for Wildland Fire Management, 2009 (or current version).
- NFPA: Standard 1144 – Standard for Reducing Structure Ignition Hazards from Wildland Fire, 2008 (or current version).
- NFPA: Standard 1561 – Standard on Emergency Services Incident Management System, 2008 (or current version).
- DoD Instruction 6055.06: DoD Fire and Emergency Services (F&ES) Program, 21 December 2006 (or current version).

In addition to the above policies and standards, the U.S. Army Wildland Fire Policy requires the development and implementation of an Integrated Wildfire Management Plan for all facilities and training lands subject to potential wildland fires. The Navy has a CNRNW *Wildfire Fire Management Plan*. The Navy and ORNG are currently revising, updating and expanding the specific portion of that plan applicable to NWSTF Boardman. The Navy, ORNG, and other range users would implement the plan as part of the Proposed Action. The following management practices would be applied.

- The use of tracer rounds and other incendiary devices would be limited to periods when the risk of wildfire is at acceptable levels. Tracer rounds would be restricted during the fire season from May to October and use would require appropriate approval from NAS Whidbey Island. Tracer ammunition (tracer rounds) are bullets that are built with a small pyrotechnic charge in their base. Ignited by the burning powder, the pyrotechnic composition burns very brightly, making the projectile visible to the naked eye. This enables the shooter to follow the bullet trajectory in order to make aiming corrections.

- To determine if the wildfire risk is at an acceptable level for the use of aerial flares and smoke-grenades, and tracer rounds outside of the fire season, an internal *Fire Danger Rating and Wildland Fire Risk Management Matrix* would be utilized. This protocol utilizes weather data (temperature, relative humidity, and precipitation), fire danger rating (low through extreme), military activity, firefighting assets available on site, and other special considerations to identify the appropriate use of aerial flares and smoke-grenades.
- Use of aerial flares and smoke-grenades would be addressed on a case-by-case basis based on the risk assessment, application of ammunition, and timing during the fire season. Pyrotechnic devices, such as smoke grenades, are to be used in metal containments during high fire risk periods.
- Restrict mechanical equipment and weapons used during training to graveled surfaces. No off road driving would be allowed except for rare circumstances (e.g., firefighting or emergencies) and with authorization.
- Parking would be allowed only in graveled pullouts or parking lots.
- Past agricultural-related fences that are no longer needed (internal to NWSTF Boardman's perimeter fence) would be removed, which would reduce fuel loading (by reducing the amount of fuel that can build up on the windward side of a fence line) and increase fire response.
- Establish or repair and maintain water storage capabilities.
- The Navy currently maintains a system of 60-foot-wide fire breaks throughout NWSTF Boardman. In addition to these fire breaks, roads and trails that are already part of NWSTF Boardman would act as minor fire breaks in the event of low intensity fires. However, approximately 219.6 ac. of existing fire breaks will be no longer be maintained by disking, and will be re-vegetated to native short grasses. The fire break system will also be modified with the addition of 19.2 ac. of new fire breaks. Figure 3.13-3 presents the recommended modifications to the NWSTF Boardman fire break system.
- Smoking during operation or use of the proposed training ranges would be banned except in authorized smoking areas.
- Fire prevention protocols developed in the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan* (Appendix H) would be included in the Standard Operating Procedures and emphasized during the facility orientation and safety briefing.
    - All units training at NWSTF Boardman are to be briefed on wildfire hazards. Briefings include instructions on reporting fires to Range Control, and procedures for fires occurring down range.
    - All maintained roads within NWSTF Boardman are considered fire breaks. A number of roads also have additional fire breaks disked alongside the road. Range Operations personnel also clear vegetation from roads and reduce tumble weed accumulations along fence lines annually.
    - On high, very high, and extreme fire danger days, the Oregon Army National Guard (ORARNG) Fire Captain will recommend modifying, limiting, or prohibiting the use of pyrotechnics.
- The possibility of yearly fires exists within the heaviest use areas (i.e. weapons training ranges). Proper implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan* would reduce the risk of and prevent large fires. The *Draft NWSTF Boardman Integrated Wildland Fire Management Plan* would be reviewed, and appropriate changes considered, on an annual basis.

Additionally, NAS Whidbey Island is currently working on a Wildfire Response Plan for Boardman to request response from NAS Whidbey Island for large scale fires. This response plan would include seven additional qualified personnel, equipment and vehicles. Because of the distance between NWSTF Boardman and NAS Whidbey Island, it would be expected to have a 6 to 8 hour response time.

Oregon National Guard would have a trained, dedicated fire crew and a wildland fire truck on-site during weapons training during times of high fire risk. The ORNG also would have CH-47 or CH-60 helicopter with aerial firefighting capability available or a Single Engine Air Tanker (SEAT) contracted for use during high fire risk seasons. During live fire operations, the ORNG would typically have one Type VI Brush Truck. In extreme situations, the OMD can provide one Type VII and up to three Type VI Bush Trucks with water and WFFF (Foam) capability, two to six personnel with Wildland Fire Red Card training, and one Lead Forest Officer/Fire Captain, as well as ORNG aviation assets.

3.13.3.4.2 Monitoring

Military personnel would monitor for fire at all times during range operations from observation towers and while on patrols. Post-operation fire monitoring training would be conducted by range operators while conducting range clearance duties.

3.13.3.4.3 Mitigation Measures

No mitigation measures are warranted for wildfire based on the analysis presented in Section 3.13.3 (Environmental Consequences) and implementation of proposed management practices and monitoring.

3.13.3.5 Summary of Effects and Conclusions

Table 3.13-1 summarizes the effects of and mitigation measures for the No Action Alternative, Alternative 1, and Alternative 2 for wildfire.

Table 3.13-1: Summary of Wildfire Effects

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	• Not applicable. No construction proposed.
Training and Testing Activities	• Under the No Action Alternative, the primary causes of ignition related to training activities would be target maintenance and non-explosive practice munitions impacting the ground surface within the Main Target Area. • Depending on the area affected, the impacts from a wildland fire caused by training activities could have a significant impact on vegetation, wildlife, and air quality. However, with current training practices and the implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan*, the impacts from training activities would be reduced and localized.
Impact Conclusion	• The No Action Alternative would not result in significant increases in the potential for wildfire from training activities.

Table 3.13-1: Summary of Wildfire Effects (continued)

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
Alternative 1	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	• The proposed increases in construction activities under Alternative 1 at NWSTF Boardman could increase the potential of wildfire. • Any potential for short- or long-term negative effects to vegetation or wildlife from fires caused by construction of the proposed training ranges on NWSTF Boardman would increase under Alternative 1.
Training and Testing Activities	• The proposed increases in training under Alternative 1 at NWSTF Boardman could increase the potential of wildfire. • Any potential for short- or long-term negative effects to vegetation or wildlife from fires caused by operating the proposed training ranges on NWSTF Boardman would increase under Alternative 1.
Impact Conclusion	• Alternative 1 would result in significant increases in the potential for wildfire from training activities. Depending on the area affected, the impacts from a wildland fire caused by training activities could have a significant impact on vegetation, wildlife, and air quality. However, with current training practices and the implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan*, the impacts from training activities would be reduced and localized.
Alternative 2	
Ground Disturbing Activities and Alteration of Habitat	
Construction Activities	• The proposed increases in construction under Alternative 2 at NWSTF Boardman could increase the risk of wildfire. • Any potential for short- or long-term negative effects to vegetation or wildlife from fires caused by construction of the proposed training ranges on NWSTF Boardman would increase under Alternative 2.
Training and Testing Activities	• The proposed increases in training under Alternative 2 at NWSTF Boardman could increase the risk of wildfire. • Any potential for short- or long-term negative effects to vegetation or wildlife from fires caused by operating the proposed training ranges on NWSTF Boardman would increase under Alternative 2.
Impact Conclusion	• Alternative 2 would result in significant increases in the potential for wildfire from training activities. Depending on the area affected, the impacts from a wildland fire caused by training activities could have a significant impact on vegetation, wildlife, and air quality. However, with current training practices and the implementation of the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan*, the impacts from training activities would be reduced and localized.

Note: NWSTF = Naval Weapons Systems Training Facility

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4 CUMULATIVE IMPACTS

4.1 INTRODUCTION AND APPROACH TO ANALYSIS

The analysis of cumulative impacts presented in this section follows the requirements of the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) guidance (Council on Environmental Quality 1997). Council on Environmental Quality regulations provide the implementing regulations for NEPA. The regulations define cumulative impacts as:

> …the impact on the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 Code of Federal Regulations [C.F.R.] §1508.7).

An action's contribution to the overall impacts in a region of influence is of particular concern. While a single project may have minor impacts, overall impacts may be collectively significant when the project is considered together with other projects on a regional scale. A cumulative impact is the additive effect of all projects in the geographic area (defined in Section 4.2.3, Define the Geographic Boundaries and Timeframe for Analysis). The CEQ provides guidance on cumulative impact analysis in *Considering Cumulative Impacts under the National Environmental Policy Act* (Council on Environmental Quality 1997). This guidance further identifies cumulative impacts as those environmental impacts resulting "from spatial and temporal crowding of environmental perturbations. The impacts of human activities will accumulate when a second perturbation occurs at a site before the ecosystem can fully rebound from the impacts of the first perturbation." Noting that environmental impacts result from a diversity of sources and processes, this guidance observes that "no universally accepted framework for cumulative impacts analysis exists," while noting that certain general principles have gained acceptance. The CEQ provides guidance on the extent to which agencies of the federal government are required to analyze the environmental impacts of past actions when they describe the cumulative environmental effect of an action (Council on Environmental Quality 2005). This guidance provides that a cumulative impacts analysis might encompass geographic boundaries beyond the immediate area of an action and a timeframe that includes past actions and foreseeable future actions. Thus, the CEQ guidelines observe, "[it] is not practical to analyze cumulative impacts of an action on the universe; the list of environmental impacts must focus on those that are truly meaningful" (Council on Environmental Quality 2005).

4.2 APPROACH TO ANALYSIS

4.2.1 OVERVIEW

Cumulative impacts on each resource addressed in Chapter 3 (Affected Environment and Environmental Consequences) were analyzed for the No Action Alternative, Alternative 1, and Alternative 2 in combination with past, present, and reasonably foreseeable future actions in the relevant geographic area. The cumulative impacts analysis included the following steps, which are described in more detail below:

1) Identify appropriate level of analysis for each resource.
2) Define the geographic boundaries and timeframe for the cumulative impacts analysis.
3) Describe current resource conditions and trends.
4) Identify potential impacts of each alternative that might contribute to cumulative impacts.

5) Identify past, present, and other reasonably foreseeable future actions in the relevant geographic regions that affect each resource.
6) Analyze potential cumulative impacts.

4.2.2 Identify Appropriate Level of Analysis for Each Resource

The cumulative impacts analysis focused on meaningful impacts from past, present, and reasonably foreseeable future actions. The level of analysis for each resource was commensurate with the intensity of the impacts identified in Chapter 3 (Affected Environment and Environmental Consequences). The rationale for the level of analysis applied to each resource is described in the resource-specific sections below.

4.2.3 Define the Geographic Boundaries and Timeframe for Analysis

The geographic boundaries for the cumulative impacts analysis included the Naval Weapons Systems Training Facility (NWSTF) Boardman (see Figure 2-1) as well as the associated special use airspace. The boundaries for migratory species were expanded to include land and airspace where activities on NWSTF Boardman might impact these species. Primary considerations from areas outside NWSTF Boardman include impacts associated with air quality, socioeconomics, transportation, cultural, land use compatibility (e.g., wind farms), vegetation, wildlife, and wildfire.

Determining the timeframe for the cumulative impacts analysis requires estimating the length of time the impacts of the Proposed Action would last and considering the specific resource in terms of its history of degradation (Council on Environmental Quality 1997). The Proposed Action includes ongoing and anticipated future military readiness activities. While United States (U.S.) Department of the Navy (Navy) and Oregon National Guard (ORNG) training and testing requirements change over time in response to world events and several other factors, the general types of activities addressed by this Environmental Impact Statement (EIS) are expected to continue indefinitely, and the associated impacts would occur indefinitely. Therefore, the cumulative impacts analysis is not bounded by a specific future timeframe. For past actions, the cumulative impacts analysis only considers those actions or activities that have ongoing impacts. While the cumulative impacts analysis is not limited by a specific timeframe, it should be recognized that available information, uncertainties, and other practical constraints limit the ability to analyze cumulative impacts for the indefinite future. Future actions that are speculative are not considered.

4.2.4 Describe Current Resource Conditions and Trends

The Affected Environment sections of Chapter 3 (Affected Environment and Environmental Consequences) describe current resource conditions and trends, and discuss how past and present human activities influence each resource. The current aggregate impacts of past and present actions are reflected in the baseline information presented in Chapter 3 (Affected Environment and Environmental Consequences). This information is used in the cumulative impacts analysis to understand how past and present actions are currently impacting each resource and to provide the context for the cumulative impacts analysis.

4.2.5 Identify Potential Impacts of Alternatives 1 and 2 That Might Contribute to Cumulative Impacts

The direct and indirect impacts of the alternatives, presented in Chapter 3 (Affected Environment and Environmental Consequences), were reviewed to identify impacts that are relevant to the cumulative impact analysis. Key factors considered include the current status and sensitivity of the resource and the intensity, duration, and spatial extent of the impacts for each training or testing activity. In general, long-term rather than short-term impacts and widespread rather than localized impacts were considered more likely to contribute to cumulative impacts. For example, for biological resources, population-level impacts were considered more likely to contribute to cumulative impacts than were individual-level impacts. Negligible impacts were not considered further in the cumulative impacts analysis.

4.2.6 Identify Other Actions and Other Environmental Considerations That Affect Each Resource

A list of other reasonably foreseeable future actions was compiled for NWSTF Boardman and surrounding areas based on the scoping process, communications with other agencies, state and local officials, a review of other military activities, literature review, and other available information. These actions were reviewed to determine if they should be considered further in the cumulative impact analysis. Factors considered when identifying other actions to be included in the cumulative impacts analysis included the following:

- Whether the action is likely or probable (i.e., reasonably foreseeable), rather than merely possible or speculative.
- The timing and location of the other action in relationship to proposed construction, training, and testing activities.
- Whether the other action and each alternative would affect the same resources.
- The current conditions, trends, and vulnerability of resources affected by the other action.
- The duration and intensity of the impacts of the other action, and whether the impacts have been truly meaningful, historically significant, or identified previously as a cumulative impact concern.

4.2.7 Analyze Potential Cumulative Impacts

The combined impacts of all other actions, including the current aggregate impacts of past and present actions described in the baseline, were characterized and summarized. The incremental impacts of Alternatives 1 and 2 were then “added to” the combined impacts of all other actions to describe the cumulative impacts that would result if Alternatives 1 and 2 were implemented. The cumulative impact analysis considered additive, synergistic, and antagonistic impacts. A qualitative analysis was conducted in most cases based on the available information. The analysis in Chapter 3 (Affected Environment and Environmental Consequences) indicates that the direct and secondary impacts of Alternatives 1 and 2 would not be materially different. Therefore, the cumulative impacts discussions below apply to both alternatives.

4.3 Other Actions Analyzed in the Cumulative Impacts Analysis

4.3.1 Overview

Table 4-1 lists the other actions and other environmental considerations that were identified for the cumulative impacts analysis and Figure 4-1 highlights each project’s geographic relation to NWSTF Boardman. Descriptions of each action and environmental consideration carried forward for analysis are provided in the following sections.

Table 4-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis

Name of Action	Lead Agency or Proponent	Location	Timeframe	Retained for Further Analysis?
Portland General Electric Boardman Plant Emissions Controls	Portland General Electric	Morrow County	Ongoing, Future	Retained
Portland General Electric Carty Generating Station	Portland General Electric	Morrow County	Future	Retained
Gas Transmission Northwest Carty Lateral Project	Portland General Electric	Morrow County	Ongoing, Future	Retained
Boardman-Hemingway Electric Power Transmission Line	Idaho Power	Morrow and Umatilla County	Future	Retained
Umatilla Electric Cooperative Transmission Line	Umatilla Electric Cooperative	Morrow County	Future	Retained
Leaning Juniper Wind Power Facility	Iberdrola Renewables, Inc.	Gilliam County	Past, Ongoing, Future	Retained
Montague Wind Power Facility	Iberdrola Renewables, Inc.	Gilliam County	Past, Ongoing, Future	Retained
Shepherds Flat Wind Farm	GE – Caithness	Morrow and Gilliam County	Past, Ongoing, Future	Retained
Saddle Butte Wind Power Facilities	Saddle Butte Wind, LLC	Morrow County and Gilliam County	Ongoing, Future	Retained
Baseline Wind Energy Facility	First Wind	Gilliam County	Future	Retained
Ella Butte	2Morrow Energy, LLC	Morrow County	Future	Retained
Willow Creek	Invenergy	Morrow and Gilliam County	Past, Ongoing, Future	Retained
Threemile Canyon Wind Farm	John Deere Wind Energy	Morrow County	Past, Ongoing, Future	Retained
Wheatridge Wind Energy Facility	Wheatridge Wind Energy, LLC	Morrow and Umatilla County	Future	Retained
Sullivan's Wind Farm (Horned Butte)	Landowner	Gilliam County	Ongoing, Future	Retained
Multi-Species Candidate Conservation Agreement – Habitat Conservation	Threemile Canyon Farms, Portland General Electric, The Nature Conservancy, and the Oregon Department of Fish and Wildlife	Morrow County	Past, Ongoing, Future	Retained

Table 4-1: Other Actions and Other Environmental Considerations Identified for the Cumulative Impacts Analysis (continued)

Name of Action	Lead Agency or Proponent	Location	Timeframe	Retained for Further Analysis?
U.S. Army Umatilla Chemical Depot Base Redevelopment Plan	Department of Defense	Morrow and Umatilla County	Past, Ongoing, Future	Retained
US 730 Corridor Refinement Plan (2007)	Oregon Department of Transportation	Umatilla County	Past, Ongoing, Future	Retained
I-84 Transportation Plan, Intersection Study	Morrow County	Morrow County	Past, Ongoing, Future	Dismissed because of negligible to minor impacts on resources affected by the Proposed Action.
Boardman Airport Pavement Improvements	Oregon Department of Aviation	Morrow County	Past, Ongoing, Future	Dismissed because of negligible to minor impacts on resources affected by the Proposed Action.
Umatilla County Westland Road/I-84/I-82 Interchange Area Transportation Plan (2004)	Umatilla County	Umatilla County	Past, Ongoing, Future	Dismissed because of negligible to minor impacts on resources affected by the Proposed Action.
Port of Morrow Sustainable Agriculture and Energy Center	Port of Morrow	Morrow County	Past	Dismissed because of negligible to minor impacts on resources affected by the Proposed Action.
Additional routes of the Oregon Trail	U.S. Park Service	Umatilla, Morrow, Gilliam, and Sherman Counties	Future	Dismissed because action involves only planning and policy-related activities; specific future actions are speculative.
Proposed Establishment and Modification of Oregon Military Training Airspace	Department of the Air Force; National Guard Bureau (NGB)	Umatilla, Morrow, Gilliam, Sherman, Wasco Counties (and others)	Future	Dismissed because of negligible impacts on resources affected by the Proposed Action.
Building 39 Replacement	U.S. Navy	NWSTF Boardman	Past	Retained
Implementation of INRMP	U.S. Navy	NWSTF Boardman	Past, Ongoing, Future	Retained

Notes: U.S. = United States, U.S. Navy = United States Department of the Navy, NWSTF = Naval Weapons Systems Training Facility, INRMP = Integrated Natural Resources Management Plan, I-84 (82) = Interstate 84 (82), GE = General Electric, Inc. = Incorporated, LLC = Limited Liability Company

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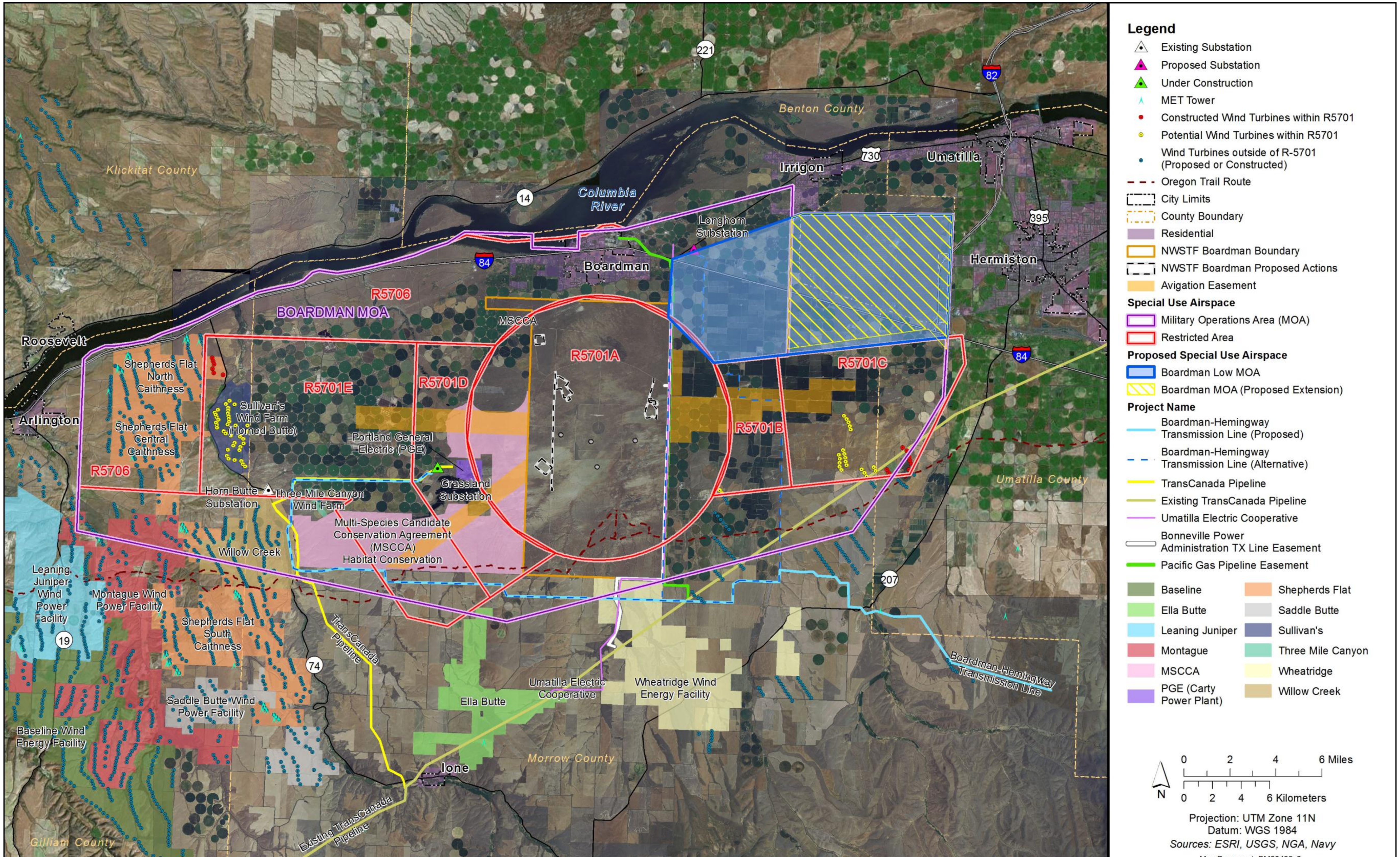

Figure 4-1: Locations of Other Actions and Other Environmental Considerations Identified and Retained for the Cumulative Impacts Analysis

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4.3.2 Portland General Electric Boardman Plant Emissions Controls

The Portland General Electric (PGE) Boardman Plant is a 585-megawatt (MW) coal-fired electricity generating plant located about 2.5 miles (mi.) (4.0 kilometers [km]) west of NWSTF Boardman. As part of the new operating plan for the Boardman Plant, PGE has installed or will install the following new emissions controls at the plant:

- New low-nitrogen oxide burners and modified overfire air ports were installed in spring 2011 to comply with Best Available Retrofit Technology standards for oxides of nitrogen.
- An activated carbon injection system to allow capture and removal of mercury from the plant's emissions was installed in spring 2011.
- A separate dry sorbent injection system to comply with Best Available Retrofit Technology standards for sulfur dioxide is required to be operational by 2014. Portland General Electric also expects to switch to a coal supply that contains less sulfur.

Portland General Electric has agreed to end the use of coal at the Boardman Plant by December 31, 2020. They are evaluating potential options to replace the power from the Boardman Plant—or convert the existing plant to a different fuel—as part of its integrated resource planning process. New emissions controls at the Boardman Plant are expected to reduce nitrogen oxide emissions by about 50 percent and permitted levels of sulfur dioxide emissions by 75 percent (Table 4-2). State rules also require new controls to reduce the plant's mercury emissions by 90 percent. All coal-related emissions from the Boardman plant would be reduced to zero with the end of coal-fired operations in 2020.

Table 4-2: Air Pollutant Emissions Estimates for Portland General Electric Boardman Plant and Proposed Carty Generating Station

Emissions Source	Criteria and Precursor Air Pollutant Emissions in Tons/Year				
	CO	NO_x	VOC	SO_x	PM_{10}
Boardman Plant – 2011	8,881	11672	92	30,450	1,056
Boardman Plant – 1 July 2012	8,881	7105	92	30,450	1,056
Boardman Plant – 1 July 2015	8,881	5836	92	3,045	346
Boardman Plant – 1 July 2018	8,881	1776	92	3,045	346
Proposed Carty Generating Station	99.1	124.8	23.7	22.7	94.9

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, SO_x = sulfur oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter, VOC = volatile organic compounds

4.3.3 Portland General Electric Carty Generating Station

Portland General Electric's (PGE's) 2009 Integrated Resource Plan calls for PGE to build or buy power from a baseload natural gas-fired plant by 2015. As part of this process, the company is building a new 440 MW natural-gas-fired power plant adjacent to its existing Boardman Plant west of NWSTF Boardman. The plant's construction is expected to create up to 500 jobs over 3 years, with 20 new permanent positions once completed. It also would add significant capital investment to the Morrow County tax base (Portland General Electric 2011). Estimated air pollutant emissions from the plant are provided in Table 4-2.Construction on the Carty Generating Station began in June 2014 and is expected to be complete by July 2016.

4.3.4 GAS TRANSMISSION NORTHWEST CARTY LATERAL PROJECT

Gas Transmission Northwest (now TransCanada) proposes to construct, own, and operate a natural gas pipeline lateral that would connect to its existing mainline system (the TransCanada Pipeline) near Ione in Morrow County, Oregon. The project would be capable of delivering approximately 200 million cubic feet a day of natural gas to the Carty Generating Station proposed by PGE (see Section 4.3.3). The project would consist of (Gas Transmission Northwest 2011):

- Approximately 24.4 mi. (32.2 km) of 20-inch (50.8 centimeter)-diameter natural gas pipeline installed underground,
- One metering station,
- One pig launcher and one receiver,
- One mainline valve, and
- Related pipeline facilities.

The proposed route would begin at the Ione compressor station on Gas Transmission Northwest's mainline and run north-northwest to the southwestern corner of the Boardman Conservation Area, and follow the western boundary of the Boardman Conservation Area. The proposed route would then cross agricultural land on Threemile Canyon Farms and terminate at the proposed Carty Generating Station (Gas Transmission Northwest 2011).

Gas Transmission Northwest filed an application with the Federal Energy Regulatory Commission for authorization under Section 7(c) of the Natural Gas Act (15 United States Code [U.S.C.] §717f(c)) and Part 157 of Federal Energy Regulatory Commission regulations (18 C.F.R. Part 157). An Environmental Assessment for the Carty Lateral Project was completed in December 2012 to support the authorization process (Gas Transmission Northwest 2012). Potential impacts identified in the Environmental Assessment are primarily related to construction of the project and include:

- Impacts associated with wetland and water body crossings.
- Temporary disturbance and permanent loss of grassland and shrub-steppe vegetation.
- Disturbance of wildlife and wildlife habitat, potentially including the Washington ground squirrel, long-billed curlew, and other special status species.
- Noise and air pollutant emissions.

A certificate of public convenience and necessity authorizing the construction and operation from the Federal Energy Regulatory Commission was granted on March 14, 2013. Construction is scheduled to begin in 2015.

4.3.5 BOARDMAN TO HEMINGWAY ELECTRIC POWER TRANSMISSION LINE

Idaho Power Company (IPC) is proposing to construct, operate, and maintain a single-circuit 500-kilovolt (kV) overhead electric transmission line and associated facilities. The proposed transmission line would be constructed between the existing Hemingway Substation, located near Melba in Owyhee County, Idaho, to either the planned Grassland Substation adjacent to the Boardman Generating Plant, or to the planned Longhorn Substation, located near Boardman in Morrow County, Oregon. The proposed Boardman to Hemingway (B2H) route is about 300 mi. (482.7 km) long and would cross federal, state, and private lands in six counties in Oregon and Idaho. The originally proposed route from the Boardman Generating Plant bypasses the NWSTF Boardman range via a path along the southern border of NWSTF

Boardman. Two alternative routes and one route variation (described below) were developed as part of the Boardman to Hemingway proposal.

The Horn Butte Alternative would include a new Horn Butte Substation adjacent to PGE's existing 500 kV Boardman-to-Slatt electric power transmission and upgrades to the electric transmission line and existing Slatt Substation approximately 6.5 mi. (10.5 km) west of the Grassland Substation.

The Longhorn Alternative would be an 18.4-mi. (29.6 km)-long electric power transmission line located predominantly on private land in Morrow County. The Longhorn Alternative electric power overhead transmission line would cross 2.9 mi. (4.7 km) of a Navy Approach Zone Easement on private property adjacent to the NWSTF Boardman. The terms of the approach zone easement limit structure heights within the easement to a maximum of 35 feet (ft.) (10.7 meters [m]) above grade; this height limitation may affect the design of structures in the easement area, unless Idaho Power Company can reach agreement with the Navy for taller structures.

The Longhorn Variation was developed to address concerns raised by the Navy and agricultural landowners with the Longhorn Alternative about encroachment on military airspace, to minimize effects on irrigated agriculture in the area, and to align with an existing electric power transmission corridor. The Longhorn Variation, although closer to the NWSTF Boardman, would align with an existing overhead electric power transmission line. While the centerline of the Longhorn Variation would not extend onto NWSTF Boardman, the right-of-way would.

For all proposed routes and variations, the current project design proposes the use of single circuit lattice steel and tubular steel towers in the vicinity of the NWSTF Boardman facility. The typical heights range from 100 to 185 ft. (30.5 to 56.4 m). In accordance with the 2009 Memorandum of Understanding on siting electric transmission lines on federal land, the Bureau of Land Management (BLM) is conducting a NEPA analysis (Draft EIS released December 2014) on the entire overhead electric transmission line and the Navy is participating in the process. The B2H Draft EIS identifies the Longhorn Variation as the Environmentally Preferred Alternative as well as the Agency Preferred Alternative. If the Longhorn Variation is ultimately chosen, a right of entry agreement for survey work would have to be provided by the Navy prior to construction and a permanent easement established for the transmission line.

In response to comments on the Draft EIS submitted by adjacent agricultural landowners, and at the request of IPC, an additional route alternative, the West of Bombing Range Road Variant (WBRR) will be considered by BLM in the Final EIS for B2H. IPC has informed BLM that WBRR is now their preferred route. On June 22, 2015 IPC submitted a formal easement request to the Navy to accommodate WBRR. As described in that request, WBRR would cross NWSTF property in the location of the existing BPA transmission line. The Bonneville Power Administration (BPA) line would be relocated to the east side of Bombing Range Road in conjunction with the UEC improvements. The B2H line across NWSTF would meet Navy operational constraints for tower height. The review of the easement application and BLM's analysis of WBRR in the B2H Final EIS are ongoing.

In light of the permitting delays, siting impediments and alternative route and variation development that have occurred and are expected to continue, IPC estimates that the in-service date for the Boardman-to-Hemingway line would be in 2020 or beyond. Potential impacts are primarily related to construction of the project and include:

- Impacts to ground and air training activities to NWSTF and associated military airspace
- Impacts associated with wetland and water body crossings
- Temporary disturbance and permanent loss of grassland and shrub-steppe vegetation
- Disturbance of wildlife and wildlife habitat, potentially including the Washington ground squirrel, long-billed curlew, and other special status species
- Noise and air pollutant emissions

4.3.6 UMATILLA ELECTRIC COOPERATIVE ELECTRIC POWER TRANSMISSION LINE

Umatilla Electric Cooperative (UEC) is proposing to construct, maintain, and operate a new north-south 230 kV electric power transmission line between the proposed Longhorn Substation and the Juniper Canyon area. Much of the route would be along the east side of Bombing Range Road, immediately adjacent to NWSTF Boardman. The project would replace/upgrade UEC's existing 30 kV and 115 kV electric power distribution lines, some of which would be converted to underground circuits with the same construction project. Structure heights and span lengths for the new transmission line are being designed to meet Navy height constraints in and adjacent to R-5701 and the existing run-in easement south of Homestead Lane. The present design calls for a mix of 100, 70, and 130 ft. (30.5, 21.3, and 39.6 m) structure heights (monopole and H-frame). Potential impacts are primarily related to construction of the project and include:

- Impacts associated with wetland and water body crossings
- Impacts to existing agricultural activities, primarily crop circles
- Temporary disturbance and permanent loss of grassland and shrub-steppe vegetation
- Disturbance of wildlife and wildlife habitat, potentially including the Washington ground squirrel, long-billed curlew, and other special status species
- Noise and air pollutant emissions
- Potential proliferation of wind developments in the area with the available capacity of the new 230kV transmission line

4.3.7 WIND ENERGY PROJECTS

In general, the potential impacts associated with wind energy projects in the NWSTF Boardman region include:

- Temporary disturbance and permanent loss of grassland and shrub-steppe vegetation
- Disturbance of wildlife and wildlife habitat
- Noise and air pollutant emissions
- Flight safety and electromagnetic interference

4.3.7.1 Leaning Juniper Wind Power Facility

The Leaning Juniper Wind Power Facility is located southwest of Arlington, in Gilliam County, which is west of NWSTF Boardman and began operation in June 2011. The facility boundary is adjacent to the Arlington city limit boundary and immediately east of the Boardman Military Operations Area (MOA). The applicant proposed a "maximum turbine number" layout of 133 General Electric (GE) 1.5 MW turbines. The site certificate applied for (May 2007) by Iberdrola Renewables, Inc. limits the total number of turbines to 133 and the total peak generating capacity to 279 MW. The GE 1.5 MW turbines would have a rotor diameter of approximately 253 ft. (77 m). They would be mounted on tubular steel towers with a hub height of approximately 262 ft. (80 m). The site certificate would allow the certificate holder to select other turbine types, not exceeding 3.0 MW turbines with a rotor diameter of approximately 328.1 ft. (100 m) and a tower hub-height of 328.1 ft. (100 m). The facility includes a substation located adjacent to the Bonneville Power Administration Jones Canyon Switching Station. An aboveground transmission line less than 400 ft. (121.9 m) in length carries the power from the substation to a Bonneville Power Administration switching station and an interconnection with the regional transmission grid through Bonneville Power Administration's McNary-Santiam 230 kV transmission line.

4.3.7.2 Montague Wind Power Facility

The Montague Wind Power Facility is a proposed wind energy facility that has not yet been constructed. Montague Wind Power Facility, LLC (a wholly-owned subsidiary of Iberdrola Renewables, Inc.) filed a site certificate application in April 2010 and was granted a Site Certificate by Oregon Department of Energy (ODOE) in September 2010. The facility is located in Gilliam County, approximately 4 mi. (6.4 km) south of Arlington. The site overlaps with lands associated with the Leaning Juniper Wind Power Facility, and as such, lies immediately west of the Boardman MOA. The Montague Wind Power Facility would have a peak generating capacity of up to 404 MW. The average electric generating capacity would be up to 134.7 MW. In the application, the applicant has identified two turbines that represent the range of turbines that could potentially be used at the facility: the GE 1.5 MW turbine (described in Section 4.3.7.1) and the Vestas V100 3.0 MW turbine. The applicant has analyzed a possible "minimum turbine layout" of 134 3.0 MW turbines and a possible "maximum turbine layout" of 269 1.5 MW turbines. The Vestas V100 turbines would have a rotor diameter of approximately 328.1 ft. (100 m). They would be mounted on tubular steel towers with a hub height of approximately 328.1 ft. (100 m). An amendment to extend the construction start and completion dates by 2 years, and to reduce the blade tip clearance for the turbines was approved by the Oregon Energy Facility Siting Council in June 2013. A second amendment was requested in March 2015 that requested the Council extend the construction start deadline from September 14, 2015 to September 14, 2017, and the completion deadline from September 14, 2018 to September 14, 2020. A decision by the Oregon Energy Facility Siting Council on the amendment request is anticipated in late 2015 or early 2016.

The applicant intends to connect the Montague Wind Power Facility to the regional transmission system through the Bonneville Power Administration's Slatt Substation. The applicant has proposed one preferred and two alternate 230 kV transmission line routes between Slatt and a facility substation in the central part of the facility. A second substation would be built to collect power from turbines in the western part of the project, and a 230 kV transmission line would connect the western area substation to the central substation.

4.3.7.3 Shepherds Flat Wind Power Facilities

In July 2008, the ODOE's Energy Facility Siting Council issued a site certificate to Caithness Shepherds Flat, LLC for the Shepherds Flat Wind Farm. The approved facility was a wind energy facility consisting of up to 338 GE2.5 XL turbines wind turbines, each with a peak generating capacity of 2.5 MW. The turbines would have a rotor diameter of approximately 328 ft. (100 m). They would be mounted towers with a hub height between 246 and 328 ft. (75 and 100 m). The Shepherds Flat Facility underlies Restricted Area R-5706 and the westernmost portion of R-5701B. Amendment #1 divided the Shepherds Flat Wind Farm into three separate facilities, each having an individual site certificate. The three approved facilities occupy the site boundary of the previously-approved Shepherds Flat Wind Farm and, combined, have the same number of turbines and the same peak generating capacity as the originally proposed Shepherds Flat Wind Farm. The Council approved site certificates for the three new facilities: Shepherds Flat North, Shepherds Flat Central, and Shepherds Flat South. A 230 kV transmission line connects the facility to the regional transmission system at the Bonneville Power Administration's Slatt Substation. The 230 kV interconnection lines for Shepherds Flat North, Shepherds Flat Central, and Shepherds Flat South are jointly owned. All three facilities use the same transmission line corridor.

4.3.7.4 Saddle Butte Wind Power Facilities

The proposed Saddle Butte Wind Park would be a wind energy facility consisting of up to 171 wind turbines (the types and heights of which have not yet been determined) and related facility components (including a substation, a field workshop, meteorological towers, access roads, and aboveground and underground transmission lines). The facility would have a peak generating capacity of up to 565 MW. The proposed facility site is entirely on private lands located in Morrow County and Gilliam County approximately 20 mi. (32.2 km) south of the Columbia River between Eightmile Canyon and State Highway 74. The northeast portion of the proposed wind farm underlies the southwest portion of the Boardman MOA.

The applicant intends to connect the facility to the regional transmission system through a Bonneville Power Administration substation adjacent to the Slatt Switching Station. The applicant has proposed a single transmission corridor running approximately 19 mi. (30.6 km) to the BPA Slatt interconnection facility. In the Notice of Intent, the applicant explains that alternate corridors are not proposed because the described corridor is the shortest route and reduces impacts by sharing transmission structures previously approved for the Shepherds Flat Wind Farm. In the site certificate application, the applicant may propose adjustments to the corridor. In June 2011, the applicant requested an extension for up to a year and was granted to process this order. The extension order indicated that Navy and Air Force should be contacted to discuss airspace impacts/radar impacts.

On October 7, 2013, the ODOE issued a Proposed Order in the Matter of the Application for a Site Certificate for the Saddle Butte Wind Park Facility, as required by Oregon Revised Statute (ORS) 469.370(4) and Oregon Administrative Rule 345-015-0230(2). The Proposed Order recommends that the Oregon Energy Facility Siting Council grant the site certificate for the Saddle Butte Wind Park Facility subject to the recommended conditions. Pursuant to ORS 469.370(5), following issuance of the Proposed Order, the Council must conduct a contested case proceeding on the application for site certificate. In October 2013, a Notice of Contested Case was published; however, the contested case hearing date has not yet been determined. The contested case has been stayed by the hearing officer pending Oregon Energy Facility Siting Council approval. Additional information is available on the Oregon DOE Energy Facility Siting Council website.

4.3.7.5 Baseline Wind Energy Facility

The proposed Baseline Wind Energy Facility would have a peak generating capacity of up to 500 MW. The Notice of Intent does not state a range of possible turbine sizes, but assuming that the applicant would propose turbine sizes in the range of 1.5–3.0 MW, the Baseline Wind Energy Facility would consist of 166–333 wind turbines, either GE 82.5 or Vestas V112 turbines. The GE 82.5 turbine has a rotor diameter of 270.7 ft. (82.5 m) and the hub height is 262.5 ft. (80.0 m). The Vestas V112 3.0 MW wind turbine has a rotor diameter of 367.5 ft. (112.0 m) and a hub height of 308.4 ft. (94.0 m). Other facility components include up to four substations, an operations and maintenance facility, up to 10 meteorological towers, access roads, and aboveground and underground transmission lines. The proposed facility site is entirely on private lands located in Gilliam County approximately 7 mi. (11.3 km) south of Arlington and 12 mi. (19.3 km) north of Condon, completely outside of the Boardman MOA. As of December 22, 2011, the applicant submitted a preliminary application, but the Draft Proposed Order has yet to be published. The applicant (First Wind) intends to connect the Baseline Wind Energy Facility to the regional transmission system through a proposed new Bonneville Power Administration substation (the Diamond Butte Substation) located adjacent to the existing 500 kV Ash-Marion transmission line. Aboveground 230 kV transmission lines would connect the facility substations to the Bonneville Power Administration substation.

4.3.7.6 Ella Butte

The proposed Ella Butte wind farm is approximately 2 mi. (3.2 km) southwest of the NWSTF Boardman facility, outside of the R-5701 restricted airspace, and immediately north of Ione. 2Morrow Energy, LLC. is the developer for the Ella Butte wind farm, which, as proposed, will include up to 52 turbines, access roads, a substation, and maintenance facility.

4.3.7.7 Willow Creek

The Willow Creek wind farm is located approximately 8 mi. (12.9 km) west of NWSTF Boardman, immediately north of the Shepherds Flat South Wind Farm facility. The wind farm, operated by Invenergy, consists of 48 GE Energy 1.5sle turbines, which have a rotor diameter of approximately 253 ft. (77 m). The rotors are mounted on towers with a hub height between 200 and 262 ft. (61 and 80 m).

4.3.7.8 Threemile Canyon Wind Farm

The Threemile Canyon Wind Farm is located in Morrow County, Oregon, immediately south of the Restricted Area R-5701B, and underneath the Boardman MOA. John Deere Wind Energy is the owner and operator. PacifiCorp is purchasing energy from the project under a long-term power purchase agreement. The project is powered by Vestas 1.65 MW V82 turbines, The Vestas V82 towers are typically between 230 and 263 ft. (70 and 80 m) in height and a blade length of approximately 134.5 ft. (41 m). Combined, the maximum height of these turbines can be approximately 397 ft. (121 m). The wind farm consists of six turbines for a total project capacity of 9.9 MW. Operation of the Threemile Canyon Wind Farm began in spring 2009.

4.3.7.9 Wheatridge Wind Energy Facility

The proposed Wheatridge Wind Energy Facility is located immediately south of NWSTF Boardman. Wheatridge West is located entirely within Morrow County, approximately 7 mi. (11.3 km) northwest of Heppner. Wheatridge East is located approximately 16 mi. (25.7 km) northeast of Heppner and will span Morrow County and Umatilla County. The project site boundary, including an intraconnection, spans approximately 50,000 acres (ac.) (20,234.3 hectares [ha])—all on private property. The number and size of turbines is not yet determined; however, the applicant is considering up to 300, 1.7–3.0 MW turbines. The primary application for a site certificate was submitted to Oregon's Energy Facility Siting Council (EFSC) on December 19, 2014, and the complete application was submitted July 1, 2015.

4.3.7.10 Sullivan's Wind Farm (Horned Butte)

Invenergy (as Horn Butte Wind Energy, LLC) had proposed to construct an additional 26 MW of wind power under the existing interconnection request. The location of the Horn Butte Wind Farm is to the west of NWSTF Boardman, underlying the westernmost portion of Restricted Area R-5701B. Construction will consist of 17 GE 1.5sle wind turbines. These turbines are typically between 246 and 263 ft. (60 and 80 m) in height and have a blade length of approximately 124.6 ft. (38 m). Combined, the maximum height of these turbines can be approximately 387 ft. (118 m). Currently, the Navy is negotiating solutions with the landowner, Sullivan.

4.3.8 MULTI-SPECIES CANDIDATE CONSERVATION AGREEMENT WITH ASSURANCES FOR THREEMILE CANYON FARMS

The U.S. Fish and Wildlife Service (USFWS) approved a Multi-Species Candidate Conservation Agreement with Assurances (MSCCAA) with Threemile Canyon Farms, PGE, The Nature Conservancy, and the Oregon Department of Fish and Wildlife on March 1, 2004 (U.S. Fish and Wildlife Service 2011). The MSCCAA is effective for 25 years and provides conservation measures for the Washington ground squirrel, ferruginous hawk, loggerhead shrike, and sage sparrow (covered species) on a combined total of approximately 23,480 ac. (9,502 ha) immediately west of NWSTF Boardman. The Nature Conservancy manages 22,600 ac. (9,146 ha), dedicated by Threemile Canyon Farms and protected under a conservation easement, with the intent of maintaining and improving native shrub-steppe and grassland habitats for the covered species and other associated wildlife. This area is referred to as the Boardman Conservation Area. The remaining 880 ac. (356 ha) are protected from development, and owned and managed for conservation purposes by PGE (David Evans and Associates 2004).

4.3.9 U.S. ARMY UMATILLA CHEMICAL DEPOT BASE REDEVELOPMENT PLAN

The Umatilla Chemical Depot (UCD) was located northeast of NWSTF Boardman and lies beneath the proposed Boardman MOA (Proposed Extension, see Figure 2-5). Originally listed in the 1988 Base Realignment and Closure process, the Department of Defense (DoD) ultimately recommended closure of UCD during the 2005 Base Realignment and Closure round of announcements. Chemical munitions incineration concluded in October 2011. Incinerator demolition and associated decontamination activities are expected to be complete in 2013 or 2014. For more than two decades, county and regional leaders, as organized by the State of Oregon and recognized by the DoD as the Umatilla Army Depot Reuse Authority, have been studying and preparing for the eventual closure of the Umatilla Army Depot. The redevelopment plan (Umatilla Army Depot Reuse Authority 2010) adopted by the Reuse Authority was submitted to the DoD for review and approval in August 2010. The redevelopment plan recommends the following future land uses:

- Agriculture – 641 ac. (259.4 ha)
- Wildlife refuge – 5,759 ac. (2,330.6 ha)
- ORNG military training – 7,500 ac. (3,035.1 ha)
- Highway commercial industrial – 1,112 ac. (450 ha)
- Oregon Department of Transportation Interstate corridor – 91 ac. (36.87 ha)
- Industrial restricted – 959 ac. (388.1 ha)
- Industrial unrestricted – 913 ac. (369.5 ha)

Recommendations in the Redevelopment Plan were based on the assumption that USFWS would take ownership and manage the proposed wildlife refuge lands under the National Wildlife Refuge System. However, in a letter dated November 15, 2011, USFWS notified the U.S. Army that they are no longer in a position to pursue a land transfer agreement. However, it is still the intent of the Land Reuse Authority that the 5,613 ac. (2271.5 ha) parcel would be managed primarily for wildlife.

Chemical munitions disposal operations at UCD were successfully concluded in October 2011. Completion of the mission and closure of the UCD will result in economic impacts from lost jobs. In the long-term, these impacts might be mitigated through reuse of the property. Closure also means that the potential public health and safety risks from an accidental release of stockpiled materials have been eliminated. Air pollutant emissions associated with the disposal operations would also cease. Potential impacts associated with reuse include temporary disturbance and permanent loss of grassland and shrub-steppe vegetation; disturbance of wildlife and wildlife habitat, potentially including the long-billed curlew, western burrowing owl, and other special status species; noise; and air pollutant emissions from construction, new industrial sources, and any associated increase in traffic.

4.3.10 US 730 Corridor Refinement Plan

The US 730 Corridor Refinement Plan is specifically concerned with the section of US 730 from the east city limits of the City of Irrigon (MP 176.61) to the west city limits of the City of Umatilla (MP 182.54). In 2003, the Oregon Department of Transportation designated this section of US 730 as a Safety Corridor. This section of the highway is currently characterized as having a significant number of private-access driveways, a limited supporting roadway network and a significant amount of high-speed-truck and through traffic. The US 730 Corridor Refinement Plan identifies highway safety improvements along this section of US 730 over the next 20 years. Potential impacts are primarily related to construction of the project and include noise and air pollutant emissions.

4.4 Cumulative Impacts Analysis

4.4.1 Soils

The analysis in Section 3.1 (Soils) indicates that the No Action Alternative, Alternative 1, and Alternative 2 would result in long-term, minor, and localized impacts to soils. With the exception of replacement of building 39, none of the other actions listed in Table 4-1 would affect soils at NWSTF Boardman. Building 39 was demolished and Building 2996 replaced it in its existing footprint with no impacts to soils. Therefore, detailed analysis of cumulative impacts on soils is not warranted.

4.4.2 Air Quality

4.4.2.1 Impacts of the Alternatives that Might Contribute to Cumulative Impacts

As discussed in Section 3.2 (Air Quality), all of the Alternatives would result in air pollutant emissions and emissions would increase under Alternatives 1 and 2 (see Tables 3.2-3 and 3.2-4). The increases in emissions would be attributable to mobile sources; primarily additional aircraft overflights and operation of vehicles and equipment on the new ranges. The air pollutants emitted in the greatest quantities would be nitrogen oxides (NO_x), suspended particulate matter less than or equal to 10 micrometers (µm) in diameter (PM_{10}), suspended particulate matter less than or equal to 2.5 µm in diameter, and carbon monoxide (CO). In addition, construction projects proposed under Alternatives 1 and 2 would generate fugitive dust and combustion emissions during the construction phase. These emissions would not contribute to long-term changes in air quality because the emissions would be intermittent and temporary.

4.4.2.2 Impacts of Other Actions

Most of the other actions listed in Table 4-1 would result in some air pollutant emissions. Many of the other actions would involve construction. Construction projects would generate fugitive dust and combustion emissions during the construction phase, and would contribute incrementally to air quality impacts. However, these emissions would not contribute to long-term changes in air quality because the emissions would be intermittent and temporary.

Other actions that would result in long-term changes in air quality include the PGE Boardman Plant emissions controls, which would substantially reduce emissions of some pollutants (see Table 4-2), and operation of the PGE proposed Carty Generating Station, which would increase emissions (see Table 4-2). The net effect of these two projects would be long-term, substantial decreases in NO_x, sulfur oxides

(SO_x), suspended particulate matter, and mercury emissions, and minor increases in CO and volatile organic compound (VOC) emissions.

Completion of the chemical demilitarization operation and closure of the UCD would result in a reduction in air pollutant emissions. Current emissions limits in the UCD Title V permit are (all values in tons per year): CO = 102, NO_x = 96, VOC = 39, SO_x = 39, PM_{10} = 20, and PM = 75. Actual reductions in emissions could be less because the limits are maximum allowable values, rather than actual emissions.

The *U.S. Army Umatilla Chemical Depot Base Redevelopment Plan* includes recommendations to reuse portions of the UCD for industrial development. The Redevelopment Plan was approved by the U.S. Department of Housing and Urban Development in August 2010. It is reasonable to assume that stationary sources of air pollutant emissions would be associated with at least some of the industrial development. However, sufficient information is not available to predict future air pollutant emissions. Any proposed major industrial sources of air pollutants would be subject to permitting by the Oregon Department of Environmental Quality under Title V of the Clean Air Act. A major source of air emissions has the potential to emit 100 tons of any criteria pollutant, 10 tons of any single hazardous air pollutant, or 25 tons of any combination of hazardous air pollutants. Minor sources of air pollutant emissions would be regulated by the Oregon Department of Environmental Quality under Air Contaminant Discharge Permits.

4.4.2.3 Cumulative Impacts on Air Quality

Construction projects proposed under Alternatives 1 and 2 and several of the other actions would generate fugitive dust and combustion emissions during the construction phase. While these emissions would not contribute to long-term changes in air quality, the potential for localized cumulative impacts exists if the projects were to overlap in time and space. The primary concern would be simultaneous generation of fugitive dust.

Construction projects that could generate fugitive dust in the immediate vicinity of NWSTF Boardman include the Carty Generating Station, Carty Lateral Project, and Idaho Power B2H Transmission Line. The anticipated start date for construction of the range enhancements at NWSTF Boardman is 2015. Construction of the Carty Generating Station and Carty Lateral Project are not expected to overlap with construction. In light of the permitting delays and siting impediments that have occurred and are expected to continue, Idaho Power estimates that the in-service date for the Boardman-to-Hemingway line would be in 2020 or beyond. Therefore, timing for the construction phase of these projects could overlap with construction of proposed range enhancements at NWSTF Boardman. It is anticipated that cumulative impacts from dust would be minimized on all projects by using management practices (MPs), such as wetting the construction site.

As summarized in Table 4-3, long-term increases in NO_x, SO_x, and suspended particulate matter associated with Alternative 1, Alternative 2, and the Carty Generating Station would be offset by long-term decreases achieved by emissions controls at the PGE Boardman Plant and completion of chemical demilitarization operations at UCD. Likewise, the increases associated with Alternative 1, Alternative 2, and the Carty Generating Station would negate some of the air quality benefits achieved by the Boardman Plant emissions controls. Alternative 1, Alternative 2, and the Carty Generating Station would increase CO and VOC emissions. Future stationary source emissions could also result from industrial reuse of UCD, but sufficient information is not available to predict future air pollutant emissions. Future industrial sources at UCD would be subject to Clean Air Act and Oregon Department of Environmental Quality permitting requirements, which would help to control the incremental contribution of these potential sources. An overall decrease in air pollutant emissions is expected when the Alternatives are considered in combination with past, present, and reasonably foreseeable future actions (Table 4-3). Therefore, significant cumulative impacts on air quality are not expected under any of the Alternatives.

Table 4-3: Predicted Change in Annual Air Pollutant Emissions Associated with the Proposed Action and Other Actions

Emissions Source	Change in Criteria and Precursor Air Pollutant Emissions in Tons/Year				
	CO	NO_x	VOC	SO_x	PM_{10}
Alternative 1	73	690	15	21	76
Alternative 2	57	269	12	21	69
Boardman Plant	0	-9,896	0	-27,405	-710
Proposed Carty Generating Station	99	125	24	23	95
Umatilla Chemical Depot Closure	-102	-96	-39	-39	-20
Net Change =	**54**	**-9,210**	**-2**	**-27,396**	**-587**

Notes: CO = carbon monoxide, NO_x = nitrogen oxides, VOC = volatile organic compounds, SO_x = sulfur oxides, PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter

4.4.3 Water Resources

The analysis presented in Section 3.3 (Water Quality) indicates that the No Action Alternative, Alternative 1, and Alternative 2 would have negligible impacts on water resources. Therefore, detailed analysis of cumulative impacts on water resources is not warranted.

4.4.4 Noise

The analysis presented in Section 3.4 (Noise) indicates that sensitive receptors could be affected by acoustic stressors. Potential impacts include localized disturbances, which are brief events after which normal environmental conditions would return quickly (ambient). The impacts of the No Action Alternative, Alternative 1, and Alternative 2 would be cumulative with other actions that cause acoustic disturbances to sensitive receptors. Based on the analysis presented in Section 3.4 (Noise) and the reasons summarized below, the incremental contribution of Alternatives 1 and 2 to cumulative impacts would be low for the following reasons:

- Noise impacts from training activities under Alternative 1 are minor to negligible on lands outside of the Target Areas, and are further reduced by the training schedule.
- Aircraft training and demolition activities on NWSTF Boardman occur primarily during the day, whereas individuals are most sensitive to noise at night.
- The areas surrounding NWSTF Boardman are primarily agricultural and thus, very few members of the public are exposed to noise from training activities on NWSTF Boardman.

Future development, consisting of the specific projects listed in Section 3.4 (Noise), along with regional growth of urban areas and regional increases in wind development, would incrementally increase average noise levels during construction as well as during operation (e.g., wind turbines). Construction related to new development would result in short-term increases in daytime noise levels in the vicinity of those projects. In rural portions of Morrow, Gilliam, and Umatilla Counties, vehicle noise from increased traffic on local roads and regional highways would be the largest sources of increased noise.

Daytime noise levels would likely increase more than nighttime noise levels. Substantial increases in sources of intrusive noise are not expected.

While noise from wind turbines will increase the sound environment in their immediate vicinity, an expert panel review on wind turbine noise and health effects (American Wind Energy Association and Canadian Wind Energy Association 2009) determined that (1) noise from wind turbines does not pose a risk of hearing loss or any other adverse health effect in humans; (2) subaudible, low frequency noise and infrasound from wind turbines do not present a risk to human health; (3) some people may be annoyed at the presence of noise from wind turbines but annoyance is not a pathological entity; and (4) a major cause of concern about wind turbine noise is its fluctuating nature. Some may find this noise annoying, a reaction that depends primarily on personal characteristics as opposed to the intensity of the noise level.

Overall, cumulative increases in long-term average sound levels in rural portions of Morrow, Gilliam, and Umatilla Counties from planned and proposed projects would not be significant. Additionally, the increase in training activities associated with the Proposed Action would not increase long-term community noise levels above 65 A-weighted decibels beyond the boundaries of NWSTF Boardman, except for a small portion of agricultural land immediately west of Boardman (0.94 square miles [2.4 square kilometers]). Therefore, further analysis of cumulative impacts on the noise environment is not warranted.

4.4.5 VEGETATION

4.4.5.1 Impacts of the Alternatives that Might Contribute to Cumulative Impacts

Based on the analysis in Section 3.5 (Vegetation), impacts to vegetation under all of the action alternatives that might contribute to cumulative impacts include loss or degradation of native vegetation communities, in particular grassland and shrub-steppe communities. Approximately 50 ac. (20 ha) would be converted from predominately native grassland and shrub-steppe communities to permanent development under Alternative 1 and Alternative 2, and approximately 30 ac. (12.1 ha) would be temporarily disturbed and revegetated in accordance with the post-construction restoration plan (Appendix F). Disturbances during construction and training activities could also exacerbate existing invasive plant problems, if not mitigated or controlled.

4.4.5.2 Impacts of Other Actions

Other future actions that could impact shrub-steppe and grassland communities include the B2H Transmission Line, UEC Transmission Line, Carty Lateral Project, various wind energy projects, and reuse development at UCD. The type of impacts would be similar to those expected under Alternative 1 and Alternative 2; temporary disturbance, loss of some shrub-steppe and grasslands, and invasive plant problems. Impacts would occur during construction and some form of vegetation maintenance would likely be necessary over the long-term.

The Carty Lateral Project would impact about 147 ac. (59 ha) of natural vegetation, including shrub-steppe and grasslands, along the currently proposed route (Gas Transmission Northwest 2011).

Johnson and Erickson (2011) estimated that 4,958 ac. (2,006 ha) of total land area would be directly impacted by existing and proposed wind energy projects in the Columbia Plateau Ecoregion through 2015. They estimated that approximately 2,578 ac. (1,043 ha) of non-agricultural vegetation types, primarily grassland and shrub-steppe vegetation, would be lost in the Ecoregion to wind energy development through 2015. Specific losses in the immediate vicinity of NWSTF Boardman have not been quantified, but would be expected to be substantially less than that of the Ecoregion.

Impacts of the B2H projects on shrub-steppe and grassland communities will depend largely on the final route selected. Alternatives being considered include routes that would be on or near NWSTF Boardman. All of these projects are subject to established federal or state agencies environmental planning and review processes. Therefore, it is expected that all of these projects will include measures to avoid, minimize, and restore impacts.

Several ongoing and future actions in the region are intended to provide long-term benefits for shrub-steppe and grassland communities:

- The MSCCAA described in Section 4.3.8 (Multi-species Candidate Conservation Agreement With Assurances for Threemile Canyon Farms) is protecting and enhancing shrub-steppe and grassland communities at the Boardman Conservation Area adjacent to NWSTF Boardman. The Nature Conservancy is currently implementing a restoration plan for the Boardman Conservation Area (Elseroad 2007, 2008), which includes eradicating invasive plants in degraded habitats and revegetating the areas with native plants.
- Implementation of the *NWSTF Boardman Integrated Natural Resources Management Plan* (INRMP) has and would continue to benefit native plant communities by controlling invasive plants, conducting restoration activities, and inventorying and monitoring plant communities on NWSTF Boardman. The Plan includes co-operative management of the Research Natural Areas on NWSTF Boardman by The Nature Conservancy and the Navy, and would be updated if the new ranges were built.
- The possible establishment of a wildlife refuge on the UCD as part of the Redevelopment Plan would protect approximately 5,613 ac. (2,272 ha) of shrub-steppe and grassland communities.
- Continued management of lands at the Lindsay Prairie Preserve by The Nature Conservancy would protect and enhance shrub-steppe and grassland communities.
- Continued management of lands at the Horn Butte Area of Critical Environmental Concern by the BLM would protect and enhance shrub-steppe and grassland communities.

4.4.5.3 Cumulative Impacts on Vegetation

Cumulative impacts of future actions on shrub-steppe and grassland communities were considered in local (e.g., NWSTF Boardman and the contiguous Boardman Conservation Area) and regional (e.g., Columbia Plateau Ecoregion) contexts. Other than Alternative 1 or Alternative 2, no actions that would result in adverse effects on vegetation are currently proposed formally on NWSTF Boardman.

As discussed above (see Section 4.4.5.2, Impacts of Other Actions), ongoing and future natural resources management activities on NWSTF Boardman would provide long-term benefits for shrub-steppe and grassland communities through invasive plant control and restoration. Proposed MPs and mitigation measures under Alternatives 1 and 2 would include restoring native plant communities in the southern portion of NWSTF Boardman, and modifying the fire break system. Other actions in the region such as continued management of the Boardman Conservation Area, Lindsay Prairie Preserve, and Horn Butte Area of Critical Environmental Concern, and possible establishment of a wildlife refuge at UCD would also protect shrub-steppe and grassland communities.

Future actions outside the boundaries of NWSTF Boardman, including the Carty Lateral Project, wind energy projects, the two transmission line projects, and reuse development at UCD are expected to impact shrub-steppe and grassland communities in the vicinity of NWSTF Boardman and in the region. The Carty Lateral Project is expected to impact about 147 ac. (59 ha) of natural vegetation and approximately 2,578 ac. (1,043 ha) of non-agricultural vegetation types, primarily grassland and shrub-steppe vegetation, would be lost in the Columbia Plateau Ecoregion to existing and proposed wind energy development through 2015. Estimating the area of shrub-steppe and grassland communities that would be impacted by the remaining actions is not possible based on available information. However, given the length of the proposed transmission lines and the width of the required easements (250 ft. [76 m]), the area of shrub-steppe and grasslands impacted is expected to be substantially larger than the Carty Lateral Project (147 ac. [59 ha]), which requires only a 50 ft. (15.2 m) easement. Sufficient information is not available to make conclusions regarding the significance of impacts associated with other actions. However, it is expected that other future actions would affect a relatively small percent of shrub-steppe and grassland communities in the Columbia Plateau Ecoregion (approximately 1.5 million ac. [607,028 ha] [Kagan et al. 2000]). Impacts of Alternative 1 or Alternative 2 on vegetation would be additive to the impacts of other actions that would adversely affect shrub-steppe and grassland communities in the region; however, the contribution would be small when considered relative to other actions such as wind energy development, electrical transmission lines, and historical habitat conversion to agricultural lands.

4.4.6 WILDLIFE

4.4.6.1 Impacts of the Alternatives that Might Contribute to Cumulative Impacts

The analysis presented in Section 3.6 (Wildlife) concluded that the combined effects of noise, habitat loss and alteration, and general disturbance from human activities under Alternative 1 and Alternative 2 may have a significant impact on the Washington ground squirrel. Specific impacts include physiological and behavioral responses to noise or human activity, which could lead to reduced fitness of individuals and Washington ground squirrel population declines at NWSTF Boardman. Individuals of other wildlife species, including other mammals, birds, and reptiles, may also experience reduced fitness. However, populations of other wildlife species would not be adversely affected. Habitat loss and degradation would result from construction, training, and range maintenance activities. Noise levels that result in temporary or permanent abandonment of an area would also be considered as habitat loss or alteration. As discussed in Section 3.6 (Wildlife), MPs would be implemented to avoid and minimize impacts on wildlife and their habitat, and habitat restoration would be implemented to compensate for unavoidable impacts on Washington ground squirrel habitat in accordance with the USFWS Conference Opinion issued on December 2, 2013 (Appendix B, Regulatory Correspondence).

4.4.6.2 Impacts of Other Actions

Other future actions that could impact wildlife include the B2H Transmission Line, UEC Transmission Line, Carty Lateral Project, various wind energy projects, and reuse development at UCD. The expected impacts may include temporary disturbance, habitat loss and degradation, habitat fragmentation, and incidental mortality.

The Carty Lateral Project would impact about 147 ac. (59 ha) of natural vegetation, including shrub-steppe and grasslands, along the currently proposed route (Gas Transmission Northwest 2011). Portions of the project area provide suitable habitat for the Washington ground squirrel and other special status species such as ferruginous hawk, long-billed curlew, loggerhead shrike, Swainson's hawk, and western burrowing owl. Washington ground squirrels were detected on a preliminary survey route during May 2011 field studies; however, the route was subsequently changed to avoid these areas (Gas

Transmission Northwest 2011). Surveys conducted in 2012 showed borrowing sites along the realigned route (Gas Transmission Northwest 2012).

Johnson and Erickson (2011) evaluated the cumulative impacts of wind energy development projected to occur within the Columbia Plateau Ecoregion of eastern Washington and Oregon through 2015. Approximately 2,578 ac. (1,043 ha) of non-agricultural vegetation types, primarily grassland and shrub-steppe vegetation, would be lost in the Columbia Plateau Ecoregion to existing and proposed wind energy development through 2015. This loss of vegetation corresponds to a loss of wildlife habitat. Wind turbines also cause bird and bat fatalities. For all birds combined, Johnson and Erickson (2011) estimate that total annual mortality in the Columbia Plateau Ecoregion would be 15,276 birds per year. The species composition of fatalities were estimated to be: 8.7 percent raptors; 69.5 percent passerines; 13.1 percent upland game birds; 3.8 percent doves and pigeons combined; 2.1 percent waterfowl, waterbirds, and shorebirds combined; 2.7 percent other bird types such as woodpeckers, nighthawks and swifts; and 4.5 percent non-protected European starlings, rock pigeons, and house sparrows. Total bat mortality in the Columbia Plateau Ecoregion was estimated at 7,638 per year, consisting of approximately 3,798 silverhaired and 3,670 hoary bat fatalities. The authors concluded that these fatalities are not likely significant to bird or bat populations.

Impacts of the Idaho Power B2H Transmission Line and UEC projects on shrub-steppe and grassland communities and wildlife habitat will depend largely on the final route selected. Alternatives being considered include routes that would be on or near NWSTF Boardman. In addition to the potential impacts associated with construction, the proposed transmission lines would introduce a potential electrocution and collision hazards for large birds. They would also provide perches for raptors, often in areas where none previously existed, thus potentially affecting small mammals by predation. If either transmission line were found feasible to site on NWSTF Boardman after operational compatibility review, the Navy would have to grant a right of entry for the segment of the transmission line on Navy property. All of these projects are subject to established federal or state agencies environmental planning and review processes. Therefore, it is expected that all of these projects will include measures to avoid and minimize impacts to wildlife, and restore wildlife habitat.

The ongoing and future actions listed above (see Section 4.4.5.3, Cumulative Impacts on Vegetation), intended to provide long-term benefits for shrub-steppe and grassland communities, would likely benefit wildlife. These actions include MSCCAA for the Boardman Conservation Area, implementation of the *NWSTF Boardman INRMP*, possible establishment of a wildlife refuge on UCD, and continued management of the Lindsay Prairie Preserve and the Horn Butte Area of Critical Environmental Concern.

4.4.6.3 Cumulative Impacts on Wildlife

Cumulative impacts of future actions on wildlife were considered in local (e.g., NWSTF Boardman and the contiguous Boardman Conservation Area) and regional (e.g., Columbia Plateau Ecoregion) contexts. Other than Alternative 1 or Alternative 2, no actions that would result in adverse effects on wildlife are currently proposed on NWSTF Boardman.

Ongoing and future natural resources management activities on NWSTF Boardman, Boardman Conservation Area, Lindsay Prairie Preserve, and Horn Butte Area of Critical Environmental Concern are intended to protect and benefit wildlife in the region, including the Washington ground squirrel and other special status species. Possible establishment of a wildlife refuge at UCD would protect important habitat for the western burrowing owl and other special status bird species from development. Washington ground squirrels are not known to occur on UCD. Specific benefits of these management actions are difficult to quantify given uncertainty associated with future factors such as climate change, wildfire, and invasive plant infestations.

Future actions outside the boundaries of NWSTF Boardman, including the Carty Lateral Project, wind energy projects, transmission line projects, and reuse development at UCD are expected to impact wildlife and wildlife habitat in the vicinity of NWSTF Boardman and in the region. Estimating the area of habitat that would be impacted by other actions is not possible based on available information. However, given the length of the proposed transmission lines and the width of the required easements (250 ft. [76 m]), the area impacted by the proposed transmission lines is expected to be substantially larger than the Carty Lateral Project (147 ac. [59 ha]), which requires only a 50 ft. (15.2 m) easement. Sufficient information is not available to make conclusions regarding the significance of impacts associated with other actions. However, it is expected that other future actions would affect a relatively small percent of shrub-steppe and grassland communities in the Columbia Plateau Ecoregion (approximately 1.5 million ac. [Kagan et al. 2000]). Impacts of Alternative 1 or Alternative 2 on wildlife habitat would be additive to the impacts of other actions that would adversely affect shrub-steppe and grassland communities in the region.

4.4.7 LAND USE AND RECREATION

4.4.7.1 Impacts of the Alternatives that Might Contribute to Cumulative Impacts

As discussed in Section 3.7 (Land Use), lands underneath the northeast MOA would experience aircraft overflights under the No Action Alternative, Alternative 1, and Alternative 2. The typical flight path of aircraft in the northeast MOA (Boardman Low MOA and Boardman MOA [Proposed Extension]) is climbing from low-altitude training over NWSTF Boardman to higher elevations (while within the northeast MOA) where they would turn back towards the center of NWSTF Boardman and reduce their altitude. Thus, at these higher elevations, it is not expected that there would be any changes to historical land uses or recreational activities in these areas.

4.4.7.2 Impacts of Other Actions

Most of the other actions, most notably construction actions, listed in Table 4-1, would result in some changes in land use. Construction projects contribute incrementally to land use impacts, most notably during the period of construction, rather than during operation. These impacts would not contribute to long-term changes in land use because the construction activities would be intermittent and temporary. For example, energy transmission line projects, such as the Idaho Power B2H Transmission Line could potentially change area land use during construction, as there would be a temporary loss of usability. However, upon completion of the transmission lines, it is expected that the usability of the area would be restored.

The *U.S. Army Umatilla Chemical Depot Base Redevelopment Plan* includes recommendations to reuse portions of the UCD for industrial development. The Redevelopment Plan was approved by the U.S. Department of Housing and Urban Development in August 2010. Therefore, it is reasonably foreseeable that some form of industrial development would occur there in the future based on the extensive planning effort and stakeholder involvement that has occurred to date. Industrial development would not significantly alter the usability of the area for the public, as UCD was a controlled facility.

Construction and operation of the proposed wind farm projects have minimal cumulative impacts to land use as the wind farms are generally consistent with the land use patterns within the region. Since the projects will be primarily located on agricultural land, they are less likely to impact nearby residences or recreation areas. Impacts to agricultural land would be greatest during construction of the projects because additional acreage will be required for workspace and movement of equipment and material. However, these projects have been located to minimize loss of active agricultural land and interference with agricultural operations. The proposed projects should not interfere with future plans to develop land in the area for single family, residential, agricultural, or other uses permitted under the applicable zoning ordinances provided that the proposed future uses comply with applicable setback requirements established by each host municipality. It is important to note, however, that while the projects are compatible with land use patterns in the region, construction and operation of the wind farms can have cumulative impacts to local aviators, both military and civilian, as each new wind tower would represent a hazard for aviators to avoid and could pose a compatibility issue with regards to airspace use. For further detail on these particular impacts, see Section 4.4.9 (Transportation.)

4.4.7.3 Cumulative Impacts on Land Use and Recreation

Cumulative impacts to land use would be determined significant if proposed training, range enhancements, or other area projects alter or disrupt area land use to the extent that there is a loss of usability, routine activities would no longer be feasible, and would modify either the historical or designated land use. Under Alternatives 1 and 2, there would be a moderate decrease in available airspace time for non-participating aircraft as well as a decrease in the available airspace time for non-participating aircraft in the northeast MOA. The proposed MOA would overlie the former national security area that is above the Umatilla Chemical Depot. As the proposed MOA is not a restricted area, local aviators have the ability to transit the airspace when not active; this decrease in availability is expected to be less than significant impacts. The majority of regional projects only have temporary land use impacts during the construction phase. Additionally, the activities proposed typically are compatible with existing land uses and zoning in the region. The incremental contribution to impacts on regional land use or recreational use of the area would be temporary and would not be considered to be significant.

4.4.8 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The analysis presented in Section 3.8 (Socioeconomics and Environmental Justice) indicates that increases in personnel at NWSTF Boardman and training activities would have a beneficial effect on the local economy due to an increase in spending by military personnel employed or training at NWSTF Boardman. Based on the analysis presented in Section 3.8 (Socioeconomics and Environmental Justice) and the reasons summarized below, the contribution of Alternatives 1 and 2 to cumulative impacts would be low for the following reasons:

- Economic activity, such as local employment and materials purchasing associated with the proposed construction of new facilities under Alternatives 1 and 2, would provide short-term economic benefits to the local economy that would last for the duration of the construction; however, beneficial impacts from construction would be negligible on a regional scale.
- Other economic activity, such as the presence of non-local construction crews, would also provide short-term economic benefits to the local economy for the duration of the construction activities; however, beneficial impacts from this activity would be negligible on a regional scale.
- The presence of Guard and Navy training units would represent a minimal positive net economic impact on a regional scale since personnel associated with training activities will mainly remain within NWSTF Boardman.

Future development, consisting of the specific projects listed in Section 4.3 (Other Actions Analyzed in the Cumulative Impacts Analysis), along with regional growth of urban areas and regional increases in wind development, would increase economic benefits, especially if the projects utilize local resources. Construction related to new development would result in short term increases in the utilization of local workforce. Overall, cumulative increases in long-term economic benefits in Morrow, Gilliam, and Umatilla Counties from planned and proposed projects would not be significant. Therefore, further analysis of cumulative impacts on socioeconomics is not warranted.

4.4.9 TRANSPORTATION

4.4.9.1 Impacts of the Alternatives that Might Contribute to Cumulative Impacts

The analysis in Section 3.9 (Transportation) indicates that the impacts of the No Action Alternative, Alternative 1, and Alternative 2 on transportation would be negligible. The nominal volume of additional traffic accessing NWSTF Boardman during operation of the proposed training ranges would have a less than significant impact on the level of service of Interstate 84 or Bombing Range Road.

The current restricted areas and proposed MOAs and Air Traffic Control Assigned Airspace (ATCAA) on NWSTF Boardman under the No Action Alternative, Alternative 1, and Alternative 2 limit the amount of commercial aviation traffic through the Special Use Airspace. However, flight publications and Notices to Airmen would allow general aviators the opportunity to plan around military readiness activities, and general aviators would still be allowed to operate under Visual Flight Rules within the proposed MOAs. Further, military safety precautions restrict Low-Altitude Tactical Training (LATT) training to daylight hours only, and further restrict it to the time periods of 2 hours after sunrise and 2 hours before sunset; outside of these hours, no LATT activities occur within the proposed MOA. Any impacts to non-military aviation activities would be less than significant impacts on commercial or general aviation activities as the airspace may be made available for use by nonparticipating aircraft when all or part of the airspace is not needed by the using agency.

4.4.9.2 Impacts of Other Actions

Construction and operation of the proposed wind farm projects have minimal cumulative impacts to transportation as the wind farms are generally consistent with the land use patterns within the region and do not alter local transportation routes. While the wind power projects would not cumulatively add to impacts to transportation in the region, construction and operation of the wind farms can have cumulative impacts to local aviators, both military and civilian, as each new wind tower would represent a hazard for aviators to avoid and could pose a compatibility issue with regards to airspace use. Project towers would also increase the chance of impact by low-flying aircraft. Such a collision could result in a fire (Section 4.4.13.2, Impacts of Other Actions). Appropriate marking and lighting of the towers would lessen the probability of occurrence. However, the probabilities and associated impacts would be proportional to the number of wind power projects and, thus, the number of towers constructed.

4.4.9.3 Cumulative Impacts on Transportation

Future actions outside the boundaries of NWSTF Boardman, most notably wind energy projects, are expected to decrease the availability of usable airspace (low-level) in the vicinity of NWSTF Boardman and in the region. It is expected that other future windfarm development could affect a percentage of available low-level airspace in the region. Impacts of the No Action Alternative, Alternative 1, or Alternative 2 on airspace use would be additive to the impacts of other actions that would adversely affect airspace availability. Therefore, cumulative impacts on transportation are not considered significant.

4.4.10 Cultural Resources

The analysis in Section 3.10 (Cultural Resources) indicates that the No Action Alternative, Alternative 1, and Alternative 2 would have no effect and no adverse effects on archaeological resources, historic trails, or architectural resources. Traditional cultural properties have been identified by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) within the NWSTF Boardman property boundary within the indirect area of potential effect. The Navy, in consultation with the CTUIR, determined that noise and visual intrusions associated with aircraft overflights and noise associated with weapons firing on the proposed ranges would have a potential adverse effect on traditional cultural properties under the Proposed Action. The Navy, Oregon State Historic Preservation Office, CTUIR, and Advisory Council on Historic Preservation prepared a Memorandum of Agreement (Appendix C) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the National Historic Preservation Act. Proponents of future federal actions (e.g., federal projects, federally funded projects, or projects that require a federal permit, license, or approval) that could affect cultural resources would be required to consult with Oregon State Historic Preservation Office (SHPO) and other stakeholders. This consultation process would help to ensure that impacts on cultural resources are avoided, minimized, and resolved through mitigation, when necessary. Therefore, cumulative impacts on cultural resources are not considered significant.

4.4.11 American Indian Traditional Resources

The analysis in Section 3.11 (American Indian Traditional Resources) indicates that the No Action Alternative, Alternative 1, and Alternative 2 would have no significant impacts on American Indian traditional resources. Proponents of future federal actions that could affect American Indian traditional resources would be required to consult with CTUIR. This consultation process would help to ensure that impacts on American Indian traditional resources are avoided, minimized, and resolved through mitigation, when necessary. Therefore, cumulative impacts on American Indian traditional resources are not considered significant.

4.4.12 Public Health and Safety and the Protection of Children

The analysis in Section 3.12 (Public Health and Safety and Protection of Children) indicates that the impacts of the No Action Alternative, Alternatives 1 and 2 on public health and safety would be negligible. Routine training activities conducted within NWSTF Boardman pose little risk to public health or safety outside of the training areas. Activities utilizing live ammunition do not project hazardous effects off site because of their size, and because safety zones are established specifically to control these effects. Aircraft sorties used during proposed training activities would increase, but public safety is expected to be maintained as air activities would be conducted in accordance with regulations for the use of aircraft targets, restricted areas, and MOAs/ATCAA scheduled by Naval Air Station Whidbey Island as well as through the continued issuance of Notice to Airmen. During flights, pilots avoid areas where obstructions to air navigation have been identified. Given the use of military training routes, vigilance by military pilots to avoid any obstructions or other planes, and the avoidance of flights over public areas, aircraft activities would have no significant impacts on public safety.

The Proposed Action and other activities performed and proposed by surrounding commercial, industrial, and recreational interests do not normally increase the risk of impacts on health and public safety resources. The incremental impacts of the Proposed Action do not represent any appreciable contribution to cumulative health and safety risks when added to other past, present, and reasonably foreseeable future actions. Therefore, further analysis of cumulative impacts on public health and safety and the protection of children is not warranted.

4.4.13 WILDFIRE

4.4.13.1 Impacts of the Alternatives that Might Contribute to Cumulative Impacts

The analysis in Section 3.13 (Wildfire) indicates that fire originating on NWSTF Boardman could occur as a result of current training activities, such as the use of incendiary devices, tracer rounds, smoke grenades, a projectile striking a metal object and causing a spark, or from heat generated by mechanical equipment, vehicles, or weapons. Fires resulting from construction or training activities would be expected to occur on the proposed Digital Multipurpose Training Range, Multipurpose Machine Gun Range, Convoy Live Fire Ranges, mortar firing points and the Demolition Training Range. The Navy is currently revising, updating, and expanding the specific portion of the Draft Integrated Wildland Fire Management Plan applicable to NWSTF Boardman. A summary of the measures contained therein are detailed in Appendix H. Key elements focus on reducing and preventing fires by (1) prohibiting the use of tracer ammunition during high fire risk periods; (2) requiring pyrotechnic devices, such as smoke grenades, to be used in metal containments during high fire risk periods; (3) keeping vehicles away from vegetation; (4) educating soldiers regarding smoking, fire danger, procedures for fire reporting, and vehicle use; (5) quick identification, reporting, and response to new fires; and (6) enforcing bans on smoking, off-highway vehicle use, and other high fire risks. In addition, military personnel would monitor for fire at all times during range operations from observation towers and while on patrols. Post-operation fire monitoring would be conducted by range operators while conducting range clearance duties. Oregon National Guard would have a trained, dedicated fire crew and a wildland fire truck on-site during weapons training during times of high fire risk. The ORNG also would have CH-47 or CH-60 with helicopter aerial firefighting capability available during high fire risk seasons or a single-engine air tanker contracted to be available for quick response. These actions serve to further reduce or prevent fires from military readiness activities.

4.4.13.2 Impacts of Other Actions

Other future actions that could impact the potential for wildfire include the B2H Transmission Line, Carty Lateral Project, UEC transmission line, various wind energy projects, and reuse development at UCD. Fires could occur as a result of construction or from heat generated by mechanical equipment or vehicles. However, the proposed projects implement fire protection plans which reduce the potential for wildfire ignition. For example, as part of the development of plans for PGE's new 300–500 MW natural-gas-fired power plant adjacent to its existing Boardman Plant, consultation regarding potential impacts on law enforcement services and fire protection services is planned with Morrow County Sheriff's Office, Boardman Rural Fire Protection District, and Oregon State Police. Construction of the facility would also require compliance with detailed state and local standards such as fire protection, road use, and building codes, which will minimize the potential for wildfire.

Gas Transmission Northwest proposes to construct, own, and operate a natural gas pipeline lateral that would connect to its existing mainline system in Morrow County, Oregon. The U.S. Department of Transportation is mandated to provide pipeline safety under Title 49 of the U.S.C., Chapter 601. The Pipeline and Hazardous Materials Safety Administration's Office of Pipeline Safety administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Under section 192.615 of the U.S. Department of Transportation, each pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of the plan include procedures for receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters, and establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response. Implementation of these plans serves to reduce the potential for wildfire.

The risk of fire from wind power projects would be a concern during construction, operation, and decommissioning. The degree to which the project-specific fire risk would contribute to the cumulative fire risk in the general geographic area would depend on which development scenario was selected and the extent to which the identified mitigation measures were implemented. Construction and decommissioning timing, relative to the other wind power projects and other development in the area, would also be a factor influencing the degree of the cumulative fire risk. Simultaneous construction of projects, for example, would raise the cumulative fire risk and increase the potential burden on emergency response organizations. The presence of turbine towers where now there are none, would likely increase the probability of lightning strikes and, despite the grounding systems that the wind power projects would employ, provide an increased likelihood of fire. The rate, extent, and direction of spread would be governed by the location of the fire, available fuel, temperature, wind speed and direction, presence/absence of fire breaks, and response time and capability of on-site personnel and emergency responders.

As part of the site certification process for wind energy projects, the ODOE includes specific facility conditions based on the representations in the site certificate application and supporting record. Typically, the certificate holder shall implement a fire control plan for construction and operation for wildfire suppression within the mitigation area, include in the plan appropriate fire prevention measures, methods to detect fires that occur and a protocol for fire response and suppression. Specific protocols could include coordination with local fire districts, establishment of project roads that serve as fire-breaks, presence of fire-fighting personnel, presence of earthmoving equipment, or presence of water trucks.

All of these projects are subject to established federal or state agencies environmental planning and review processes. While the potential exists for fires to occur as a result of construction or operation, it is expected that all of these projects will include measures to avoid and minimize wildfire potential.

4.4.13.3 Cumulative Impacts on Wildfire

Cumulative impacts of future actions on wildfire were considered in local and regional contexts. Other than Alternative 1 or Alternative 2, no actions that would result in increase potential for wildfire are currently proposed formally on NWSTF Boardman. As discussed above, wildfire could occur from construction or operation of other projects. These impacts on wildfire would contribute incrementally to those of Alternative 1 and Alternative 2.

Any potential for short- or long-term negative effects to vegetation or wildlife from fires caused by constructing and operating the proposed training ranges on NWSTF Boardman would increase under the action alternatives. However, the area potentially burned by accidental fires is expected to be relatively small based on implementation of the *Draft Integrated Wildland Fire Management Plan*. Wildfires caused by military training activities at NWSTF Boardman could result in significant short- and long-term effects to vegetation, wildlife, and air quality under Alternatives 1 and 2. However, with current training practices and the implementation of the *Draft Integrated Wildland Fire Management Plan*, these effects would be reduced and localized.

Future actions outside the boundaries of NWSTF Boardman, including the Carty Lateral Project, wind energy projects, the two transmission line projects, and reuse development at UCD are expected to increase the potential for wildfire in the vicinity of NWSTF Boardman and in the region. Estimating the area that would be impacted by other actions is not possible based on available information. However, it is expected that other future actions could affect a relatively small percent of vegetation or wildlife in the region. Alternative 1 or Alternative 2 would contribute incrementally to the potential for wildfire in the region. Therefore, cumulative impacts on wildfire in the region are not considered significant.

4.5 CLIMATE CHANGE

4.5.1 INTRODUCTION

Climate change is a global issue, and greenhouse gas emissions are a concern from a cumulative perspective because individual sources of greenhouse gas emissions are not large enough to have an appreciable impact on climate change. This greenhouse gas analysis considers the incremental contribution of Alternatives 1 and 2 to total estimated U.S. greenhouse emissions as compared to the No Action Alternative.

Greenhouse gases are compounds that contribute to the greenhouse effect. The greenhouse effect is a natural phenomenon in which these gases trap heat within the surface-troposphere (lowest portion of the earth's atmosphere) system, causing heating (radiative forcing) at the surface of the earth. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in greenhouse gas emissions from human activities (U.S. Environmental Protection Agency 2009). The climate change associated with this global warming is predicted to produce negative environmental, economic, and social consequences across the globe. The average global temperature since 1900 has risen by 1.5 degrees Fahrenheit (°F) (0.8 degrees Celsius [°C]) and is predicted to increase by up to 11.5°F (6.4°C) by 2100 (Karl et al. 2009).

Predictions of long-term negative environmental impacts due to global warming include sea level rise; changes in ocean pH and salinity; changing weather patterns with increases in the severity of storms and droughts; changes to local and regional ecosystems (including the potential loss of species); shrinking glaciers and sea ice; thawing permafrost; a longer growing season; and shifts in plant and animal ranges.

The *Oregon Climate Assessment Report* (Oregon Climate Change Research Institute 2010) and *Climate Change in the Northwest* (Dalton et al. 2013) present various climate modeling efforts and predictions for the region. Temperature increases are expected to continue in Oregon through the 21st century. Without a substantial reduction in the activities that produce greenhouse gases, future regional change will likely be marked by increases in temperature around 0.5°F (0.3°C) per decade. There is a much larger range of uncertainty with annual precipitation. The models do not show a clear trend in annual precipitation for the region over the next century, but do point to hotter, drier summers (Oregon Climate Change Research Institute 2010, Dalton et al. 2013).

Within the Columbia Basin where NWSTF Boardman is located, hotter and drier summers could lead to more wildfires, more invasive plants, and shifts in vegetation communities (e.g., from shrublands to grasslands) (Oregon Climate Change Research Institute 2010, Dalton et al. 2013). This pattern has been observed, to some degree, at NWSTF Boardman over the past 15–20 years. The *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012) and *Draft Integrated Wildland Fire Management Plan* (Appendix H) address these management issues and include processes for adaptive management to responded change.

4.5.2 Regulatory Framework

Federal agencies address emissions of greenhouse gases by reporting and meeting reductions mandated in laws, executive orders, and policies. The most recent of these is Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*, issued March 2015. EO 13693 shifts the way the government operates by establishing target greenhouse gas reduction goals for federal agencies. As outlined in the policy, goals shall be achieved by increasing efficiency, reducing energy use, and finding renewable or alternative energy solutions. The targets for reducing greenhouse gas emissions discussed in EO 13693 for Scope 1 (direct greenhouse gas emissions from sources that are owned or controlled by a federal agency), Scope 2 (direct greenhouse gas emissions resulting from the generation of electricity, heat, or steam purchased by a federal agency) and Scope 3 (greenhouse gas emissions from sources not owned or directly controlled by a federal agency but related to agency activities such as vendor supply chains, delivery services, and employee travel and commuting) have been set for the DoD at a 40 percent reduction of greenhouse gas from the 2008 baseline by 2025. The Navy is committed to improving energy security and environmental stewardship by reducing reliance on fossil fuels. The Navy is actively developing and participating in energy, environmental, and climate change initiatives that will increase use of alternative energy and help conserve the world's resources for future generations. The Navy Climate Change Roadmap identifies actions the Environmental Readiness Division is taking to assess, predict, and adapt to global climate change (U.S. Department of the Navy 2010). The Navy's Task Force Energy is responding to the Secretary of the Navy's energy goals through energy security initiatives that reduce the Navy's carbon footprint. The Climate Change Roadmap (5-year roadmap) action items, objectives, and desired impacts are organized to focus on strategies, policies and plans; operations and training; investments; strategic communications and outreach; and environmental assessment and prediction.

The DoD is taking specific actions regarding aircraft emissions. According to the U.S. Aviation Greenhouse Gas Emissions Reduction Plan (International Civil Aviation Organization 2012), DoD, including the Navy, has a number of specific military propulsion programs and initiatives underway to improve aircraft energy efficiency, which will also reduce greenhouse gases. These include:

- The Versatile Affordable Advanced Turbine Engines Program and several associated technology development sub-programs that strive to meet specific energy goals
- The Adaptive Versatile Engine Technology Program, which is developing critical technologies to provide military turbofan engines with 25 percent improved fuel efficiency to reduce fuel burn and provide more range, persistence, speed, and payload
- The Adaptive Engine Technology Development Program, which seeks to accelerate technology maturation and reduce risk for transition of these technologies to a military engine in the 2020+ timeframe

Such technology would be applicable to a range of military aircraft (e.g., fighters, bombers).

In a complementary effort, the President directed the Navy, Department of Energy, and U.S. Department of Agriculture to invest in the construction and operation of three biorefineries that will produce up to 100 million gallons of cost-competitive alternative diesel and jet fuel beginning in 2016 (International Civil Aviation Organization 2015). The Federal Aviation Administration (FAA) and DoD are working together with industry to coordinate and fund alternative jet fuel testing activities to ensure that alternative fuels meet required specifications. The National Aeronautics and Space Administration, FAA, and the U.S. Air Force are leading efforts to understand the benefits of alternative jet fuels on emissions that impact air quality and contrail formation.

The Navy is taking other actions ashore to implement EO 13653. The Navy is implementing sustainable practices for energy efficiency, avoidance or reduction of greenhouse gas emissions, and reduction of petroleum products use. Pursuant to *OPNAV Instruction 4100.5E-Shore Energy Management* (June 22, 2012), it is the Navy's policy to ensure energy security and legal compliance by increasing infrastructure energy efficiency and integrating cost-effective and mission-compatible alternative energy technologies, while providing reliable energy supply ashore. Among several mandates, according to OPNAV Instruction 4100.5E, the Navy shall achieve a 30 percent facility energy intensity reduction by 2015, reduce consumption of fossil fuel and increase the use of alternative fuels by the Navy's non-tactical vehicle fleet, and reduce greenhouse gas emissions. In the most cost-effective manner, the Navy will meet the following shore energy goals:

- 50 percent ashore consumption reduction by 2020
- 50 percent total ashore energy from alternative sources by 2020
- 50 percent of installations net-zero consumers by 2020
- 50 percent reduction in petroleum used in the commercial vehicle fleet by 2015

Such technology would be applicable to a range of military aircraft (fighters, bombers, etc.).

4.5.3 Greenhouse Gas Emissions in the United States

Greenhouse gas emissions occur from both natural processes and human activities. The primary long-lived greenhouse gases directly emitted by human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Although CO_2, CH_4, and N_2O occur naturally in the atmosphere, their concentrations have increased by 38 percent, 149 percent, and 23 percent, respectively, from the pre-industrial era (1750) to 2007–2008 (U.S. Environmental Protection Agency 2009).

To estimate total greenhouse gas emissions, each greenhouse gas is assigned a global warming potential; that is, the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential rating system is standardized to CO_2, which has a value of one. For example, CH_4 has a global warming potential of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis (Intergovernmental Panel on Climate Change 2007). To simplify greenhouse gas analyses, total greenhouse gas emissions from a source are often expressed as CO_2 Eq. The CO_2 Eq. is calculated by multiplying the emissions of each greenhouse gas by its global warming potential and adding the results together to produce a single, combined emission rate representing all greenhouse gases. While CH_4 and N_2O have much higher global warming potentials than CO_2, CO_2 is emitted in much higher quantities, so it is the overwhelming contributor to CO_2 Eq. from both natural processes and human activities. Global warming potential-weighted emissions are presented in terms of equivalent emissions of CO_2, using units of teragrams (Tg) (1 million metric tons, or 1 billion kilograms) of carbon dioxide equivalents (Tg CO_2 Eq.).

In 2009, the United States generated an estimated 6,633.2 Tg CO_2 Eq. (U.S. Environmental Protection Agency 2011). The 2009 inventory data (U.S. Environmental Protection Agency 2011) show that CO_2, CH_4, and N_2O contributed from fossil fuel combustion processes from mobile and stationary sources (all sectors) include approximately:

- 5,505.2 Tg of CO_2,
- 686.3 Tg CH_4, and
- 295.6 Tg N_2O.

The 6,633.2 Tg CO_2 Eq. generated in 2009 is a decrease from the 7,263.4 Tg CO_2 Eq. generated in 2007 (U.S. Environmental Protection Agency 2011). Among domestic transportation sources, light-duty vehicles (including passenger cars and light-duty trucks) represented 64 percent of CO_2 emissions, medium- and heavy-duty trucks 20 percent, commercial aircraft 6 percent, and other sources 9 percent. Across all categories of aviation, CO_2 emissions decreased by 21.6 percent (38.7 Tg) between 1990 and 2009. This includes a 59 percent (20.3 Tg) decrease in emissions from domestic military operations. To place military aircraft in context with other aircraft CO_2 emissions, in 2009, commercial aircraft generated 111.4 Tg CO_2 Eq., military aircraft generated 14.1 Tg CO_2 Eq., and general aviation aircraft generated 13.3 Tg CO_2 Eq. Military aircraft represent roughly 10 percent of emissions from the overall jet fuel combustion category.

4.5.4 Cumulative Greenhouse Gas Impacts

Table 4-4 presents greenhouse gas emissions estimates for the No Action Alternative, Alternative 1, and Alternative 2. All values are less than 1 teragram CO_2 Eq. To place the estimated values in context, 2011 U.S. greenhouse gas emissions totaled 6,702.3 teragrams CO_2 Eq. Greenhouse gas emissions would increase as result of increased fixed-wing aircraft overflights, vehicle and equipment use on the new ranges, and the associated increases in fuel consumption in the Study Area.

Table 4-4: Estimated Greenhouse Gas Emissions for Training and Testing Activities at Naval Weapons Systems Training Facility Boardman

Alternative	Annual Greenhouse Gas Emissions (teragrams CO_2 Eq.)
No Action Alternative	0.012
Alternative 1	0.038
Alternative 2	0.038

Notes: CO_2 Eq. = carbon dioxide equivalent, U.S. = United States
Source: U.S. Environmental Protection Agency 2011

4.6 Summary of Cumulative Impacts

The analysis presented in this chapter and Chapter 3 (Affected Environment and Environmental Consequences), indicate that the incremental contribution of the No Action Alternative, Alternative 1, or Alternative 2 to cumulative impacts on soils, air quality, water quality, noise, vegetation, wildlife, land use and recreation, socioeconomics and environmental justice, transportation, cultural resources, American Indian traditional resources, public health and safety, and wildfire would not rise to the level of significance. The No Action Alternative, Alternative 1, or Alternative 2 would make an incremental contribution to greenhouse gas emissions.

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5 MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.1 INTRODUCTION

5.1.1 OVERVIEW

As part of the United States (U.S.) Department of the Navy (Navy) and Oregon National Guard (ORNG) commitment to sustainable use of resources and environmental stewardship, the Navy and ORNG incorporate measures that are protective of the environment into all of their activities. Navy and ORNG Environmental Management Systems provide a formal management framework to help them achieve environmental goals through repeatable and consistent control of its operations. Compliance with environmental regulations and associated Department of Defense (DoD), Navy, and ORNG policies is accomplished through a variety of well-established programs and related plans, processes, and procedures.

National Environmental Policy Act (NEPA) regulations require that an Environmental Impact Statement (EIS) include analysis of appropriate mitigation measures. The intention of mitigation is to reduce the adverse effects of an action on the environment. Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations 1508.20) identify five ways to reduce or mitigate the severity or intensity of adverse impacts:

- Avoiding the impact altogether
- Minimizing impacts
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action
- Compensating for the impact by replacing or providing substitute resources or environments

5.1.2 APPROACH

The Navy and ORNG place a high priority on avoiding adverse effects. The process of identifying ways to reduce potential environmental effects of the Proposed Action started early in planning process for the proposed range enhancements and continued through preparation of this Final EIS. For example, sensitive resources were identified during development of conceptual plans for the proposed range enhancements and the proposed ranges were sited to avoid sensitive resources and reduce surface disturbance and site development requirements to the extent possible. In addition, several existing Navy and ORNG environmental programs and plans include established procedures, practices, or management actions that would avoid, minimize, or rectify potential impacts of the Proposed Action. In accordance with DoD, Navy, and ORNG policies, these plans are reviewed and revised on a regular basis, and would be updated to reflect changes at Naval Weapons Systems Training Facility (NWSTF) Boardman if the Proposed Action were implemented.

Accordingly, impact avoidance, minimization, and rectification measures are addressed in this EIS within the framework of existing Navy and ORNG environmental programs and plans, where appropriate. For the purposes of this EIS, these and other measures that avoid, minimize, or rectify potential impacts are referred to as management practices (MPs). Where appropriate, MPs will also be incorporated into construction contracts to facilitate implementation. The Navy and ORNG also currently employ standard practices or standard operating procedures (SOPs) to provide for the safety of personnel and equipment, as well as the success of the training and testing activities. In many cases, SOPs result in incidental environmental, socioeconomic, and cultural benefits, but they serve the primary purpose of providing for safety and mission success, and are implemented regardless of their secondary benefits. Implementation of both MPs and SOPs has been considered in the Chapter 3 (Affected Environment and Environmental Consequences) environmental analyses for each resource.

If the analyses in Chapter 3 (Affected Environment and Environmental Consequences) indicated that potential impacts could not be avoided, minimized, or rectified to an acceptable level, then the Navy and ORNG developed additional measures to reduce or eliminate the impact over time or compensate for the impact by replacing or providing substitute resources or environments. For the purposes of this EIS, such measures are referred to as proposed mitigation measures.

5.1.3 Monitoring and Adaptive Management

The Navy and ORNG are also proposing vegetation and wildlife monitoring to support implementation of the Proposed Action. Environmental monitoring involves systematic sampling of physical and biological resources to derive knowledge of the environment, its resources, and processes or activities that affect them. Monitoring can be conducted for a number of purposes, including establishing environmental baselines and trends, informing decision-making for management actions, assessing the effects of natural and human influences, assessing the effectiveness of MPs and mitigation measures, and ensuring compliance with environmental regulations. Monitoring is an important component of the Navy's natural resources management strategy implemented under the *NWSTF Boardman Integrated Natural Resources Management Plan* (*INRMP*) (U.S. Department of the Navy 2012). Environmental monitoring associated with construction and operation of the proposed activities would be incorporated into an amended INRMP and implemented as part of the INRMP in accordance with the Record of Decision. Necessary updates to the *NWSTF Boardman INRMP* and associated monitoring programs would be accomplished during routine annual reviews conducted in cooperation with ORNG, U.S. Fish and Wildlife Service (USFWS), and Oregon Department of Fish and Wildlife (ODFW). This process will help to ensure that a comprehensive and consistent approach to monitoring is accomplished for the entire NWSTF Boardman property.

The CEQ issued guidance for mitigation and monitoring on January 14, 2011. This guidance affirms that federal agencies, including the Navy, should:

- commit to mitigation in decision documents when they have based environmental analysis upon such mitigation (by including appropriate conditions on grants, permits, or other agency approvals, and making funding or approvals for implementing the Proposed Action contingent on implementing the mitigation commitments);
- monitor the implementation and effectiveness of mitigation commitments;
- make information on mitigation and monitoring available to the public, preferably through agency web sites; and
- remedy ineffective mitigation when the federal action is not yet complete.

The CEQ guidance encourages federal agencies to develop internal processes for post-decision monitoring to ensure the implementation and effectiveness of the mitigation. It also states that federal agencies may use adaptive management as part of an agency's action. Adaptive management, when included in the NEPA analysis, allows for the agency to take alternate mitigation actions if mitigation commitments originally made in the planning and decision documents fail to achieve projected environmental outcomes. Adaptive management generally involves four phases: plan, act, monitor, and evaluate. This process allows the use of the results to update knowledge and adjust future management actions accordingly. As discussed in more detail in Section 5.7.2.3 (Adaptive Management and Monitoring), the monitoring discussed in this section will be used to support adaptive management.

The following sections outline the current requirements and MPs established for each resource section. Any proposed MPs, monitoring, or mitigation measures identified in each resource section are also identified after discussion of that resource's current practices.

5.2 SOILS

5.2.1 CURRENT REQUIREMENTS AND MANAGEMENT PRACTICES

- Soils are managed from a natural resources perspective under the auspices of the *NWSTF Boardman INRMP*. Actions focus on minimizing mechanical disturbance and restoration of native habitats to minimize soil erosion, and stabilizing soils following a wildfire to the extent practicable.
- Incidental spills that could contaminate soils are avoided and minimized through the *Hazardous Waste Management Plan* (U.S. Department of the Navy 2009). Navy personnel at NWSTF Boardman receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials.
- Incidental spills from ORNG activities are addressed in Oregon Army National Guard Regulation 420-47, *Hazardous Material, Waste, and Spill Management Plan.*
- Potential soil contamination is addressed in the Range Condition Assessment and subsequent Five-year reviews, in accordance with the *Range Sustainability Environmental Program Assessment Policy Implementation Manual* (U.S. Department of the Navy 2006).

5.2.2 PROPOSED MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.2.2.1 Proposed Management Practices

The current MPs listed above would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following MPs would be implemented to avoid and minimize potential impacts to soils under Alternatives 1 and 2:

- Applicable erosion control measures would be implemented during construction to avoid and minimize the potential for wind and water erosion in accordance with the Oregon Department of Environmental Quality *Erosion and Sediment Control Manual* (Oregon Department of Environmental Quality 2005).
- A *Post-construction Habitat Restoration Plan* (Appendix F, Additional Biological Information) would be implemented following construction to reduce soil erosion.
- An *Integrated Wildland Fire Management Plan* (Appendix H, Draft Integrated Wildfire Management Plan) would be implemented to avoid and minimize impacts associated with wildfire, including the indirect effects of soil erosion after a fire. In addition to other fire protection measures, the Plan includes proposed modifications to the existing system of fire breaks (see Figure 3.13-3). If fully implemented, the total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 acres (ac.) (187 hectares [ha]) to 243 ac. (98 ha). Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible. If successful, the proposed modifications to the fire break system (see Figure 3.13-3) could result in long-term benefits to soils at NWSTF Boardman by restoring approximately

219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would reduce the potential for soil erosion.

- Incidental fuel spills would be avoided during construction and training by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- A Spill Prevention, Control, and Countermeasures Plan would be developed if quantities of fuel and other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored at NWSTF Boardman or a Heavy Expanded Mobility Tactical Truck or fuel tanker truck were parked on NWSTF Boardman. The Plan would help to ensure rapid and effective response to incidental spills and avoid contaminant migration to groundwater.
- Any spills would be managed and cleaned up in accordance with Oregon Army National Guard Regulation 420-47; a Spill Prevention, Control, and Countermeasures Plan, if deemed necessary; AR 200-1; and applicable state and federal regulatory requirements. If the ORNG is unable to contain a spill or the spill exceeded 42 gallons (gal) (158.9 liters [L]) of regulated material, the event would be immediately reported to the Oregon Emergency Response System.
- The NWSTF Boardman *Operational Range Clearance Plan* would be updated and implemented to address requirements for the new ranges.
- Under the Navy's Range Sustainability Environmental Program Assessment (RSEPA), Range Condition Assessment Five-year Reviews would continue to be conducted, and appropriate steps would be taken to analyze environmental conditions on the range and to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose risks to human health or the environment. RSEPA focus would be expanded to incorporate new range activities and new training areas under periodic assessments.
- Assessments would be conducted for Digital Multipurpose Training Range (DMPTR) (under Alternative 1), the Multipurpose Machine Gun Range (MPMGR), and both Convoy Live Fire Ranges (CLFRs) in accordance with the Army's Operational Range Assessment Program (ORAP). These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways exist for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual*.

5.2.2.2 Proposed Monitoring

No specific monitoring needs were identified for soils. However, the need for soil sampling, analysis, or monitoring would continue to be considered during Range Condition Assessment Five-year Reviews conducted under the Navy's RSEPA and during Operational Range Assessments conducted by ORNG.

5.2.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for soils based on the analysis presented in Section 3.1.3 (Environmental Consequences), implementation of current MPs, and implementation of proposed MPs.

5.3 Air Quality

5.3.1 Current Requirements and Management Practices

Equipment used by military units in the study area, including aircraft and vehicles, are properly maintained in accordance with applicable Navy and ORNG requirements. Operating equipment meets federal and state emission standards, where applicable.

5.3.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.3.2.1 Proposed Management Practices

The Navy and the ORNG propose the following MPs to avoid and minimize impacts to air quality under Alternatives 1 and 2:

- Water or another dust palliative product would be employed as necessary to minimize generation and downwind migration of fugitive dust, especially on dry, windy days and in disturbed areas where construction equipment is being used.
- Generation of dust would be minimized by placing and maintaining crushed rock or gravel on the road surfaces that are used for training. In addition, conditions would be evaluated prior to starting a training event and water or another dust palliative product would be used to minimize dust, if warranted.

5.3.2.2 Proposed Monitoring

No specific monitoring needs were identified for air quality.

5.3.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for air quality based on the analysis presented in Section 3.2.3 (Environmental Consequences) and implementation of proposed MPs.

5.4 Water Quality

5.4.1 Current Requirements and Management Practices

- Incidental spills that could contaminate groundwater are avoided and minimized through the *Hazardous Waste Management Plan* (U.S. Department of the Navy 2009). Navy personnel at NWSTF Boardman receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials.
- Potential groundwater contamination issues are addressed in the Range Condition Assessment (U.S. Department of the Navy 2004) and subsequent Five-year reviews (U.S. Department of the Navy 2011), in accordance with the *Range Sustainability Environmental Program Assessment Policy Implementation Manual* (U.S. Department of the Navy 2006) (see Section 3.1.1.2.3, Range Sustainability Environmental Program Assessment) for a general description of Range Condition Assessment).
- Incidental spills from ORNG activities are addressed in Oregon Army National Guard Regulation 420-47, Hazardous Material, Waste, and Spill Management Plan.
- An *Operational Range Clearance Plan* (U.S. Department of the Navy 2014) is implemented at NWSTF Boardman in compliance with DoD Directive 4715.11 Environmental and Explosives Safety Management. The *Operational Range Clearance Plan* includes provisions for safe management and removal of unexploded ordnance, and recycling of training munitions, munitions debris, and range scrap that has been rendered safe. It includes quality assurance and

surveillance procedures (see Section 3.1.1.2.4, Operational Range Clearance, for a general description of operational range clearance).

5.4.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.4.2.1 Proposed Management Practices

The current MPs listed above would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following MPs would be implemented to avoid and minimize potential impacts on water quality under Alternatives 1 and 2:

- Incidental fuel spills would be avoided during construction and training by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- A Spill Prevention, Control, and Countermeasures Plan would be developed if quantities of fuel and other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored at the NWSTF Boardman or a Heavy Expanded Mobility Tactical Truck or fuel tanker truck were parked on NWSTF Boardman. The Plan would help to ensure rapid and effective response to incidental spills and avoid contaminant migration to groundwater.
- Any spills on bare ground would be managed and cleaned up in accordance with Oregon Army National Guard Regulation 420-47; a Spill Prevention, Control, and Countermeasures Plan, if deemed necessary; AR 200 1; and applicable Navy, state and federal regulatory requirements. If the ORNG is unable to contain a spill or the spill exceeded 42 gal. (158.9 L) of regulated material, the event would be immediately reported to the Oregon Emergency Response System.
- Under the Navy's RSEPA, Range Condition Assessment Five-year Reviews would continue to be conducted, and appropriate steps would be taken to analyze environmental conditions on the range and to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose risks to human health or the environment. RSEPA focus would be expanded to incorporate new range activities and new training areas under periodic assessments.
- Assessments would be conducted for DMPTR (Alternative 1 only), the MPMGR, and both CLFRs in accordance with the Army's ORAP. These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways exist for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual*.

5.4.2.2 Proposed Monitoring

No specific monitoring needs were identified for water quality. However, the need for groundwater sampling, analysis, or monitoring would continue to be considered during Range Condition Assessment Five-year Reviews conducted under the Navy's RSEPA program and during ORAP conducted by ORNG.

5.4.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for water quality based on the analysis presented in Section 3.3.3 (Environmental Consequences), implementation of current MPs, and implementation of proposed MPs.

5.5 NOISE

5.5.1 CURRENT REQUIREMENTS AND MANAGEMENT PRACTICES

Activities at NWSTF Boardman comply with numerous established procedures to ensure that neither participants nor non-participants engage in activities that would endanger life or property. Aircraft SOPs are largely oriented toward safety, which also provide significant noise abatement benefits. For example, many SOPs involve flight routing and minimum altitudes. Each of these procedures increases the range of the noise source from human receptors, thus reducing noise impacts. Noise control and abatement programs are developed to minimize noise impacts whenever practicable through implementation of operational alternatives that do not degrade mission requirements or aircraft safety to identify and address incompatible development in areas that are in the vicinity of air installations.

Navy occupational noise exposure prevention procedures (Chief of Naval Operations Instruction 5100.23, *Navy Safety and Occupational Health Program Manual*) are required at NWSTF Boardman for those military personnel who might be exposed to occupational hearing hazards (e.g., military aircraft operations or land detonations). These measures are designed to minimize occupational hearing hazards and ensure there is no risk of hearing impacts from occupational noise exposure.

5.5.2 PROPOSED MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.5.2.1 Proposed Management Practices

The Navy and the ORNG propose the following MPs to avoid and minimize impacts from noise under Alternatives 1 and 2:

- Explosive Ordnance Disposal measures for reducing noise impacts during land detonation training include typically conducting detonation training during normal working hours (10:00 a.m.–4:00 p.m.). Demolition Training Range (DTR) activities will not take place after dark.
- DTR training includes additional MPs to help reduce noise levels for training with charges 100 pounds (lb.) (45.4 kilograms [kg]) net explosive weight (NEW) or greater. These could include training during times with optimal weather conditions to attenuate noise, burying the explosive charge, or bunkering the charge with sand bags. Additionally, and to the maximum extent possible, detonation training would be conducted only during days when the weather is favorable. Studies have shown that variation of temperature and wind velocity with altitude can cause a noise event to be inaudible at one time (favorable) and audible at another time (unfavorable). A number of factors affect noise propagation during training events and are considered by range managers and users when planning and conducting activities to help mitigate noise impacts. Conditions that can enhance the propagation of sound include steady winds; clear days on which “layering” of smoke, fog, or clouds are observed; cold, hazy, or foggy mornings; large temperature swings on the previous day; and high barometer/low temperatures. These conditions are avoided to the maximum extent possible when scheduling demolition activities.

5.5.2.2 Proposed Monitoring

No specific monitoring needs were identified for noise.

5.5.2.3 Proposed Mitigation Measures

- Due to hibernation patterns of the Washington ground squirrel and the nesting of migratory birds, detonations of NEWs above 50 lb. (22.7 kg) are restricted between January through

August. Detonations of NEWs greater than 50 lb. will be performed between September and December unless necessitated by operational or disposal requirements. Public notice would be given prior to detonation of 100 lb. (45.4 kg) NEW or greater.

5.6 VEGETATION

5.6.1 CURRENT REQUIREMENTS AND MANAGEMENT PRACTICES

- Vegetation is managed under the *NWSTF Boardman INRMP*. Actions focus on minimizing disturbance, controlling invasive plants and weeds, and restoring native habitats.
- All training and facility operation actions at NWSTF Boardman are reviewed by the Naval Air Station (NAS) Whidbey Island/NWSTF Boardman Natural Resources Manager for potential invasive plant and noxious weed issues.

5.6.2 PROPOSED MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.6.2.1 Proposed Management Practices

The current MPs listed in Section 5.6.1 (Current Requirements and Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following MPs would be implemented to avoid and minimize potential impacts to vegetation under Alternatives 1 and 2:

- Surveys would be conducted during the project design phase to identify existing vegetation communities and evaluate habitat quality. This information would be used during project design to support micrositing decisions. Areas of higher quality habitat (e.g., undisturbed areas with a relatively high percentage of native plant cover) would be avoided in favor of areas of lower quality habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent practicable. Micrositing efforts would be limited to buildings and structures, as opposed to targetry or other range components, because even minor changes to the range design could affect the associated surface danger zone or impact range safety in other ways. The survey data would also be used to support post-construction restoration efforts.
- Vegetation temporarily disturbed during construction would be restored in accordance with the proposed post-construction restoration plan (Appendix F, Additional Biological Information). The restoration plan would be implemented by the ORNG in accordance with the Host-Tenant that would be updated prior to implementing the selected alternative.
- Invasive plants would continue to be managed and controlled under the *NWSTF Boardman INRMP*. The Plan would be updated in cooperation with ORNG, USFWS, and ODFW during routine annual reviews to reflect the evolving invasive plant management situation associated with construction and operation of the new ranges. Updates to the Plan would include provisions for short- and long-term monitoring of invasive plants (Section 5.6.2.2, Proposed Monitoring); responsibilities and procedures for integrating efforts of the Navy, ORNG, and The Nature Conservancy; criteria for prioritizing management actions and adaptive management strategies to control invasive plants; and annual work plans, including funding requirements and funding sources.
- Transport of invasive plant seeds by ORNG vehicles and equipment would be minimized by washing vehicles and equipment before and after training events. Washing would normally occur at the unit's home station.
- The *NWSTF Boardman Draft Integrated Wildland Fire Management Plan* (Appendix H) would be finalized and implemented. In addition to other fire protection measures, the Plan includes

proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created (see Figure 3.13-3). If fully implemented, the total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.

- As part of the *NWSTF Boardman INRMP*, the Navy, in cooperation with The Nature Conservancy, is proposing to relocate Research Natural Area (RNA)-A to a more suitable location. Three RNAs (A, B, and C; see Figure 1-5) were established on NWSTF Boardman in 1978 and are co-managed by The Nature Conservancy under a Memorandum of Understanding with the Navy. The RNA program was created to (1) preserve examples of all significant natural ecosystems for comparison with those influenced by man, (2) provide educational and research areas for ecological and environmental studies, and (3) preserve gene pools of threatened and endangered plants and animals. RNA-A encompasses the Main Target Area at NWSTF Boardman, which must be used and maintained to meet mission requirements. Portions of the Main Target Area are highly disturbed by military use. While the rationale for originally establishing RNA-A within the Main Target Area is uncertain, it has become clear that this area is not functioning as an RNA and is not providing the intended scientific and educational benefits of an RNA. Therefore, the Navy, in coordination with The Nature Conservancy, is proposing to relocate RNA-A to one or more suitable locations on NWSTF Boardman. The new RNA would be sited to avoid possible conflicts with military activities and the new location would be more representative of the unique habitat types RNAs are designed to protect. Similar to existing RNA-B and RNA-C, access to the relocated RNA would normally be limited to research activities, invasive plant control, and emergency response. Vegetation communities would benefit from the increased protection and management provided by relocating RNA-A to a more suitable location.

5.6.2.2 Proposed Monitoring

Environmental monitoring involves systematic sampling of physical and biological resources to derive knowledge of the environment, its resources, and processes or activities that affect them. Monitoring can be conducted for a number of purposes, including establishing environmental baselines and trends, informing decision-making for management actions, assessing the effects of natural and human influences, and ensuring compliance with environmental regulations. Accordingly, monitoring is an important component of the Navy’s natural resources management strategy implemented under the *NWSTF Boardman INRMP*. The current Plan includes vegetation monitoring project recommendations, which will be implemented subject to the availability of funds properly authorized and appropriated under Federal law.

To the extent possible, vegetation monitoring conducted under the current *NWSTF Boardman INRMP* will be designed to support the Proposed Action, as well as existing management needs. In addition, the Plan would continue to be the primary means of designing and implementing vegetation monitoring to address the evolving management situation associated with construction and operation of the new ranges. Necessary updates to the Plan and associated monitoring would be accomplished during routine annual reviews conducted in cooperation with ORNG, USFWS, and ODFW. This process will help to ensure that a comprehensive and consistent approach to vegetation management and monitoring is accomplished for the entire NWSTF Boardman property.

5.6.2.3 Proposed Mitigation Measures

Based on the analysis presented in Section 3.5.3 (Environmental Consequences), and implementation of proposed MPs and monitoring efforts for vegetation, additional mitigation measures are not required to further reduce adverse impacts on vegetation. However, mitigation measures proposed to reduce adverse impacts on the Washington ground squirrel (see Section 3.6.3.4, Proposed Management Practices, Monitoring, and Mitigation Measures) would also result in benefits to vegetation communities at NWSTF Boardman. These proposed mitigation measures include restoration of native shrub steppe and grassland habitats at NWSTF Boardman and are discussed in detail in the USFWS Conference Opinion (Appendix B, Regulatory Correspondence).

5.7 WILDLIFE

5.7.1 CURRENT REQUIREMENTS AND MANAGEMENT PRACTICES

Current requirements and MPs applicable to wildlife at NWSTF Boardman are described in the *NWSTF Boardman INRMP*. Actions focus on minimizing disturbance, restoring native habitats, and monitoring.

5.7.2 PROPOSED MANAGEMENT PRACTICES, MONITORING, AND MITIGATION

This section presents MPs, monitoring, and mitigation measures currently proposed by the Navy and ORNG to avoid and minimize or reduce potential impacts to wildlife. As discussed above, the Navy and ORNG engaged in conferencing with the USFWS for the Washington ground squirrel. As part of the conferencing process and following publication of the Draft EIS, the Navy, ORNG, and USFWS developed additional MPs, monitoring, and mitigation measures, which are included in this Final EIS.

An adaptive management and monitoring process was also developed through conferencing with USFWS to help reduce uncertainty associated with the anticipated effects of the action and monitor the anticipated effectiveness of the proposed MPs and mitigation measures. Adaptive management is a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process (Williams et al. 2009). The *NWSTF Boardman INRMP* currently provides a mechanism to adaptively manage natural resources cooperatively with USFWS and ODFW. If a decision is made to implement the Proposed Action, commitments to fund and implement specific MPs, mitigation measures, and an adaptive management process would be made in the Record of Decision. As each individual proposed action is funded and constructed, mitigation measures and adaptive management of the area involved with that action would be implemented. The INRMP would continue to provide the overall management structure for implementing adaptive management. After the Record of Decision is signed, the INRMP would be updated to include applicable commitments made in the Record of Decision, including monitoring and mitigation. The INRMP would continue to be reviewed and updated annually through natural resources metrics meetings with USFWS, ODFW, and other stakeholders. This process will help to ensure that a comprehensive and consistent approach to adaptive management and monitoring is accomplished for the entire NWSTF Boardman property.

5.7.2.1 Proposed Management Practices

The current MPs contained in the *NWSTF Boardman INRMP* and other applicable plans would continue to be implemented, and existing programs and plans would be updated to reflect new conditions. The following additional MPs would be implemented to avoid and minimize potential impacts under the Proposed Action:

- Applicable erosion control measures would be implemented during construction to avoid and minimize the potential for wind and water erosion in accordance with the Oregon Department of Environmental Quality *Erosion and Sediment Control Manual* (Oregon Department of Environmental Quality 2005).
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- Under the Navy's RSEPA, Range Condition Assessment Five-year Reviews would continue to be conducted and appropriate steps would be taken to analyze environmental conditions on the range and to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off-range areas that could pose risks to human health or the environment. RSEPA focus would be expanded to incorporate new range activities and new training areas under periodic assessments.
- Assessments would be conducted for the DMPTR (under Alternative 1), the MPMGR, and both CLFRs in accordance with the Army's ORAP. These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways exist for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual*.
- Project-specific monitoring would be conducted during the project design phase to identify existing habitat, evaluate habitat quality, and identify wildlife currently using these habitats. This information would be used during project design to support micrositing decisions. Areas of higher quality habitat (e.g., undisturbed areas with a relatively high percentage of native plant cover) or high wildlife use (e.g., existing Washington ground squirrel burrows) would be avoided in favor of areas of lower quality habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent practicable. Micrositing efforts would be limited to buildings and structures, as opposed to targetry or other range components, because even minor changes to the range design could affect the associated surface danger zone or impact range safety in other ways. The survey data would also be used to support post-construction restoration efforts.
- Habitat temporarily disturbed during construction would be restored in accordance with the proposed post-construction restoration plan (Appendix F, Additional Biological Information). The restoration plan would be implemented by the ORNG in accordance with the Host-Tenant Agreement and Inter-Service Support Agreement that would be updated prior to implementing the proposed action.
- The MPs contained in the *NWSTF Boardman INRMP* and other applicable plans that are relevant to Washington ground squirrel conservation would continue to be implemented.
- Invasive plants would continue to be managed and controlled under the *NWSTF Boardman INRMP*, with an increase in control effort to reflect new threats introduced by the Proposed

Action. The Plan would be updated in cooperation with ORNG, USFWS, and ODFW during routine annual reviews to reflect the evolving invasive plant management situation associated with construction and operation of the new ranges. Updates to the Plan would include provisions for short- and long-term monitoring of invasive plants; responsibilities and procedures for integrating efforts of the Navy, ORNG, and The Nature Conservancy; criteria for prioritizing management actions and adaptive management strategies to control invasive plants; and annual work plans, including funding requirements and funding sources. After ranges become operational, qualitative surveys would be conducted annually within the range footprint to detect noxious weeds (Morrow County list of noxious weeds) within the identified affected areas. The purpose of these surveys is to detect noxious weeds so that they can be controlled immediately, most likely through targeted application of a glyphosate herbicide. Surveys would continue indefinitely, and controls would be implemented as necessary.

- The *NWSTF Boardman Draft Integrated Wildland Fire Management Plan* (Appendix H) would be finalized and implemented. In addition to other fire protection measures, the Plan includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created. The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.
- Explosive detonations, pyrotechnics, and live fire are not conducted when the fire danger rating is unacceptable based on the Fire Danger Rating and Wildland Fire Risk Management Matrix contained in the *NWSTF Boardman Draft Integrated Wildland Fire Management Plan* (Appendix H), unless approved by the Commanding Officer, NAS Whidbey Island. Explosive demolition training is not normally scheduled from June through September to minimize wildfire risk.
- Demolition Training Range training MPs include:
    - Conducting training during days when the weather is favorable. Studies have shown that variation of temperature and wind velocity with altitude can cause a noise event to be inaudible at one time (favorable) and audible at another time (unfavorable). A number of factors affect noise propagation during training events, and are considered by range managers and users when planning and conducting activities to help mitigate noise impacts. Conditions that can enhance the propagation of sound include steady winds; clear days on which ‘layering’ of smoke, fog, or clouds are observed; cold, hazy, or foggy mornings; large temperature swings on the previous day; and high barometer/low temperatures. These conditions are avoided to the maximum extent possible when scheduling explosive detonation training. Charges greater than 50 lb. (22.7 kg) NEW would not be detonated from January through August to avoid and minimize noise impacts on Washington ground squirrels and nesting birds, unless necessitated by operational or disposal requirements.
    - To help reduce noise levels for training with charges of 100 lb. (45.4 kg) NEW or greater additional MPs include training during times with optimal weather conditions to attenuate noise, burying the explosive charge, or bunkering the charge with sand bags.
- On NWSTF Boardman, to improve vehicle operation safety, be protective of wildlife, and reduce dust emissions, the vehicle speed limit for the range is 25 miles per hour (mph) (40.2 kilometers per hour [kph]) unless otherwise posted; however, emergency situations, operational

necessities, and certain training events may require vehicle speeds to exceed this standard speed limit. At all times on the range, vehicle operators shall use extreme caution and operate at a slow, safe speed consistent with the mission, safety, and current road and environmental conditions. Vehicle operators shall be cognizant and protective of pedestrians and wildlife while conducting all range activities.

- The only road posted above 25 mph (40.2 kph) is the Admin Main road from the main gate access to the range from Bombing Range Road to the on-range road known as "The Interstate." Speed limit on the Admin Main Road is 30 mph (48.3 kph).
- It is not expected that training requirements will require speeds in excess of 25 mph (40.2 kph) on a routine basis; however, in some training events, vehicles need to be able to react to changing tactical situations in training as they would in actual combat. Training differently than that which would be needed in an actual combat scenario would decrease training effectiveness and reduce the crew's abilities. During these activities, the 25 mph (40.2 kph) speed limit may need to be exceeded for brief periods.

5.7.2.2 Proposed Mitigation Measures

The proposed MPs described above would be implemented to avoid, minimize, and rectify impacts on natural resources. Nonetheless, the analysis presented in Section 3.6 (Wildlife) indicates that the Preferred Alternative (Alternative 2) would result in unavoidable impacts on historically occupied Washington ground squirrel habitat. Therefore, mitigation measures would be implemented to compensate for these unavoidable impacts from the Preferred Alternative, as described in the Final Conferencing Opinion with USFWS. The mitigation goal is no net loss of habitat quantity or quality, and to provide a net benefit of habitat quantity or quality, which would be achieved through in-kind and in-proximity habitat restoration and enhancement.

Despite being one of the largest remaining blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia Plateau Ecoregion, non-native plant species invasions have degraded plant communities and wildlife habitat at NWSTF Boardman. Lightning-caused wildfire, historic livestock grazing, plowing, and other land uses have contributed to the spread of non-native plant species on NWSTF Boardman. Non-native plant species were identified as one of the greatest threats to the Boardman Grasslands (Kagan et al. 2000), because they replace native vegetation and degrade wildlife habitat.

In particular, cheatgrass (*Bromus tectorum*) is a serious threat because it alters natural fire regimes by creating more abundant and continuous fine fuels (fast-drying fuel that is rapidly consumed by fire when dry) that can result in more intense, larger, and frequent fires. Intense fires that burn through high-quality native habitats can convert a diverse multi-story habitat of cryptogams, perennial grasses and forbs, and shrubs to a monoculture of cheatgrass and other invasive species that is difficult to reverse without active restoration (Elseroad 2007). Since 1998, more than 85 percent of NWSTF Boardman has been burned by wildfires, which have caused short- and long-term habitat alterations. Cheatgrass is a factor that has contributed to the intensity, size, and frequency of wildfire at NWSTF Boardman.

Restoring habitats on NWSTF Boardman that have been degraded by wildfire, non-native invasive plants, plowing, and other causes offers opportunities for in-kind and in-proximity habitat mitigation. Successful restoration or enhancement efforts on ample acreage at NWSTF Boardman could increase available native habitat for the Washington ground squirrel and other wildlife, decrease the frequency and intensity of wildfire, and improve long-term stability of the ecosystem, thus ensuring no net loss and a net benefit of habitat quantity and quality at NWSTF Boardman.

Although not required under the Endangered Species Act, the Navy and ORNG (acting as the National Guard Bureau's agent) engaged in early conferencing with the USFWS to address impacts on the Washington ground squirrel and develop conservation measures to avoid, minimize, and mitigate impacts on this candidate species. Proposed mitigation measures are based on the outcome of the conference process and are provided in the Conference Opinion issued by USFWS on December 2, 2013 (Appendix B, Regulatory Correspondence).

5.7.2.3 Adaptive Management and Monitoring

5.7.2.3.1 Introduction

Adaptive management is a decision process (Figure 5.7-1) that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. Adaptive management requires stated management objectives to guide decisions about what to try, and explicit assumptions about expected outcomes to compare against actual outcomes. It is important to know what the available management options and alternative assumptions are, in case the action that is tried does not work as expected (Williams et al. 2009).

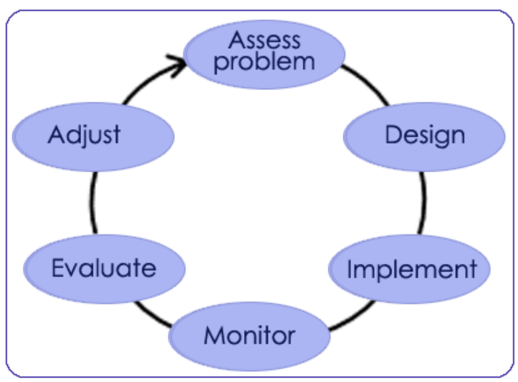

Figure 5.7-1: Adaptive Management Process

This section outlines the Navy and ORNG's proposed adaptive management process that would be used to help reduce uncertainty associated with the anticipated effects of the action and the anticipated effectiveness of the proposed MPs and mitigation measures. As discussed above, the *NWSTF Boardman INRMP* currently provides a mechanism to adaptively manage natural resources cooperatively with USFWS and ODFW. If a decision is made to implement the Proposed Action, specific commitments to an adaptive management process would be made in the Record of Decision. These commitments would be incorporated into the INRMP, and the INRMP would continue to provide the overall management structure for implementing adaptive management. This management structure includes a requirement to review and update the INRMP annually through natural resources metrics meetings that include the USFWS and ODFW. The remainder of this section and the Conference Opinion (Appendix B, Regulatory Correspondence) outlines the proposed adaptive management process, including expected outcomes and uncertainties, management objectives and decision points, monitoring, and alternative management actions.

5.7.2.3.2 Expected Outcomes and Uncertainties

Adaptive management requires explicit assumptions about expected outcomes to compare against actual outcomes (Williams et al. 2009). The anticipated effects of the action and associated uncertainties are analyzed in detail in Section 3.6.3 (Environmental Consequences). Following is a very brief summary of the expected outcomes of implementing the Preferred Alternative, including the proposed MPs and mitigation measures:

- Proposed range construction and military readiness activities would result in permanent habitat loss (25 ac. [10 ha]) and long-term habitat degradation of (561 ac. [227 ha]). Washington ground squirrel use of the affected area would decline, foraging and breeding would be adversely affected, and the Washington ground squirrel population on NWSTF Boardman could decline. Uncertainties that can be addressed through adaptive management include the possibility that impacts could be overestimated or underestimated.
- MPs would avoid and minimize impacts. Mitigation measures (habitat restoration and enhancement) would compensate for lost habitat functions and values and provide a net benefit. Ecosystem stability would improve in restored/enhanced areas, and Washington ground squirrels would persist and possibly increase in numbers in these areas. Uncertainties that can be addressed through adaptive management include the effectiveness and benefits gained from the proposed restoration.

5.7.2.3.3 Management Objectives and Monitoring

An adaptive approach requires explicit and measurable objectives. Uncertainty about how to achieve objectives is what motivates adaptive management and drives the design of the monitoring system. To address this uncertainty, stakeholders must agree on the objectives (Williams et al. 2009). The management objectives for the Proposed Action are grouped under two broad management goals that are focused on: (1) reducing uncertainties associated with potential impacts of the Proposed Action, and (2) reducing uncertainties associated with the effectiveness and benefits gained by the proposed restoration. Specific management objectives under these broad goals would serve as decision points that could trigger evaluation and adjustment phases of the adaptive management process, based on monitoring. Management objectives and monitoring are provided in the USFWS Conference Opinion provided in Appendix B (Regulatory Correspondence).

5.7.2.3.4 Alternative Management Actions

Like any iterative decision process, decision making in adaptive management involves the selection of an appropriate management action at each point in time, given the status of the resources being managed at that time (Williams et al. 2009). Potential alternative management actions for NWSTF Boardman include:

- Review of ongoing training activities to determine if additional measures or MPs, such as seasonal adjustments to training schedules, could be implemented to avoid or minimize impacts on the resources of concern while still meeting training and readiness requirements. Additionally, if no effects are observed then the monitoring could be reduced.
- Modify or refine restoration methods. For example, use more aggressive invasive plant controls on restoration sites such as pre-emergent herbicides, alter planting strategies, or restore additional acreage.
- Refine fire prevention and suppression methods.

- Evaluate the feasibility of offsite mitigation by initiating a search for suitable properties to serve as a compensatory mitigation site that could be acquired under the Navy's Readiness and Environmental Protection Initiative or the Army's Compatible Land Use Buffer Program.

5.8 Land Use and Recreation

5.8.1 Current Requirements and Management Practices

5.8.1.1 Access Restrictions

- Persons authorized to access NWSTF Boardman are all military and civilian employees of DoD, or authorized contractors and personnel from research organizations. Recreational use of NWSTF Boardman is not authorized at this time due to the nature of the facility being used as an active training range. However, the Well Springs site, Pioneer Cemetery, and a portion of the Oregon Trail on the southern range boundary are open to the public (approximately 200 ac. [80.9 ha]).
- Special Use Airspaces (SUAs) consist of airspace with defined vertical and lateral limits established for the purpose of separating certain military training activities from Instrument Flight Rules (IFR) traffic. Whenever a Military Operations Area (MOA) is being used, or is activated, nonparticipating IFR traffic may be cleared through the MOA if IFR separation can be provided by Air Traffic Control. Otherwise, Air Traffic Control will reroute or restrict nonparticipating IFR traffic. At the cessation of military use of the MOA, the airspace is deactivated and nonparticipating IFR traffic is no longer restricted in the area.
- According to Federal Aviation Administration (FAA) and DoD policy, SUA should be made available for use by nonparticipating aircraft when all or part of the airspace is not needed by the using agency. To accommodate the joint use of SUA, a Letter of Agreement or a Letter of Procedure is drafted between the controlling agency and the using agency. In the case of R-5701 [A-E] and R-5706 above NWSTF Boardman, a Letter of Agreement is in place between Seattle Center Air Route Traffic Control Center (ARTCC) and NAS Whidbey Island. Any new MOA, upon designation by the FAA, would be addressed through an update to the existing or a new letter of agreement. Through the Letter of Agreement, the Navy establishes the activation/deactivation procedures for the SUA and may outline periods when the FAA, with the Navy's concurrence, may route IFR traffic through the active SUA (NAS Whidbey Instruction 3770.1, FAA JO 7400.8).
- The avigation easements established to the east, west, and southwest of NWSTF Boardman (see Figure 3.7-1) grant the right-of-flight including the right to noise and dust inherent in aircraft flight; the right to restrict or prohibit lights, electromagnetic signals, and bird-attractants; the right to unobstructed airspace; and the right of entry upon the land to exercise those rights. Additionally, each of these avigation easements allows improvements so long as they are less than 100 ft. (30.5 m) in height and do not interfere with line of vision of pilots and as long as there are no overhead lines that exceed 35 ft. (10.7 m) in height.

5.8.1.2 Fire Management

Commander, Navy Region Northwest (CNRNW) has implemented a regional Fire Management Plan. The Navy is currently revising, updating, and expanding the specific portion of that plan applicable to NWSTF Boardman. The current fire strategy is to use the existing road system as the staging lines at which fires will be fought. The Navy currently maintains a system of 60 ft. (18.3 m) wide fire breaks throughout NWSTF Boardman. A detachment of six Navy personnel is stationed at NWSTF Boardman. Their responsibilities are to maintain the buildings, roads, wells, fences, and other infrastructure and provide security in accordance with NAS Whidbey Instruction 3120.6 (NWSTF Boardman Standard Operating Procedures).

The Navy previously had a mutual aid agreement for wildland fire response with Umatilla Chemical Depot (UCD) fire department. However, the Depot completed its mission in late 2011 and was closed down through the Base Realignment and Closure process. The fire department responsibilities have been transferred to the Oregon Military Department (OMD), and a Mutual Aid Agreement was drafted and signed in 2013 and is effective through 2018.

5.8.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.8.2.1 Proposed Management Practices

Management practices in place for other resources (e.g., Acoustic Environment, Biological Resources, Wildfire), which affect land use on NWSTF Boardman, would continue to be implemented. These MPs would also serve to prevent impacts on land use surrounding NWSTF Boardman. No additional MPs are warranted for land use and recreation based on the analysis presented in Section 3.7.3 (Environmental Consequences).

5.8.2.2 Proposed Monitoring

No monitoring measures are warranted for land use and recreation based on the analysis presented in Section 3.7.3 (Environmental Consequences).

5.8.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for land use and recreation based on the analysis presented in Section 3.7.3 (Environmental Consequences), and implementation of current MPs.

5.9 Socioeconomics and Environmental Justice

5.9.1 Current Requirements and Management Practices

There are no current mitigation measures related to socioeconomics or environmental justice. However, current requirements and MPs as well as mitigation measures in place for other resources (e.g., Air Quality, Water Resources, Noise, and Public Health and Safety) ensure that non-participants are not affected by actions on NWSTF Boardman.

5.9.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.9.2.1 Proposed Management Practices

Management practices in place for other resources (e.g., Air Quality, Water Quality, and Noise) would continue to be implemented. These MPs would also serve to prevent impacts to socioeconomics and environmental justice. No additional MPs are warranted for socioeconomics and environmental justice based on the analysis presented in Section 3.8.3 (Environmental Consequences).

5.9.2.2 Proposed Monitoring

No specific monitoring needs were identified for socioeconomics and environmental justice.

5.9.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for socioeconomics and environmental justice based on the analysis presented in Section 3.8.3 (Environmental Consequences).

5.10 TRANSPORTATION

5.10.1 CURRENT REQUIREMENTS AND MANAGEMENT PRACTICES

The Navy strives to ensure that it retains access to training areas and SUA as necessary to accomplish its mission, while facilitating joint military-civilian use of such areas to the extent practicable and consistent with safety. These goals of military access, joint use, and safety are promoted through various coordination and outreach measures, including:

- In the case of R-5701 [A-E] and R-5706 within NWSTF Boardman, a Letter of Agreement is in place between Seattle Center ARTCC and NAS Whidbey Island. Through the Letter of Agreement, the Navy and FAA establish the activation/deactivation procedures for the SUA. (NAS Whidbey Instruction 3770.1). R-5701, R-5706, and Boardman MOA are activated from 7:30 a.m. to 11:59 p.m. Monday through Friday; and at other times by Notices to Airmen (6 hours advance notice).
- Any new MOA, upon designation by the FAA, would be addressed through an update to the existing or a new Letter of Agreement.
- Non-participating aircraft are prohibited from entering Restricted Areas at NWSTF Boardman unless they have prior approval from the controlling authority (Seattle ARTCC). Non-military aviators are required to coordinate any flight activities that require entrance at any time into the Restricted Airspace with Seattle ARTCC, who in turn works with local aviators and the military training schedule to determine available flight times. If scheduling conflicts arise, Seattle ARTCC contacts the local aviator. Future requirements may be requested with NAS Whidbey Island Range Schedules and accommodated with a “non-activation” of the airspace if it is not otherwise scheduled.

5.10.2 PROPOSED MANAGEMENT PRACTICES, MONITORING, AND MITIGATION MEASURES

5.10.2.1 Proposed Management Practices

No adverse transportation impacts were identified; therefore, no proposed MPs are warranted. There are measures in place or proposed for other resources (e.g., Noise, Section 3.4; and Wildlife, Section 3.6) that also apply to transportation at NWSTF Boardman, mainly through the stipulation of training parameters.

5.10.2.2 Proposed Monitoring

No specific monitoring needs were identified for transportation.

5.10.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for transportation based on the analysis presented in Section 3.9.3 (Environmental Consequences).

5.11 CULTURAL RESOURCES

5.11.1 CURRENT REQUIREMENTS AND MANAGEMENT PRACTICES

Cultural resources at NWSTF Boardman are managed in accordance with the NHPA, the Archaeological Resources Protection Act, the Archeological and Historic Preservation Act, the American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act (NAGPRA), appropriate Navy Instructions, and the *NWSTF Boardman Integrated Cultural Resources Management Plan (ICRMP)* (U.S. Department of the Navy 2015).

5.11.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.11.2.1 Proposed Management Practices

Cultural resources at NWSTF Boardman would continue to be managed in accordance with the NHPA, the Archaeological Resources Protection Act, the Archeological and Historic Preservation Act, the American Indian Religious Freedom Act, NAGPRA, appropriate Navy Instructions, and the NWSTF Boardman ICRMP (U.S. Department of the Navy 2015) under Alternatives 1 and 2.

5.11.2.2 Proposed Monitoring

No monitoring is required for cultural resources during construction or operation of the range enhancements proposed under Alternative 1 or Alternative 2 because no National Register of Historic Places (NRHP)-eligible or -listed archaeological resources, historic trails, architectural resources, or American Indian traditional cultural properties are located in the direct Area of Potential Effect (APE). However, if during development activities the Navy or ORNG inadvertently discovers any cultural material (i.e., prehistoric or historic), all activities shall cease immediately and the NAS Whidbey Island Cultural Resources Manager shall be contacted to evaluate the discovery.

No monitoring is required for archaeological resources, historic trails, or architectural resources in the indirect APE because the Proposed Action has no potential to cause physical damage to or deterioration of these resources within the indirect APE. Potential adverse effects within the indirect APE would be limited to transient noise and visual intrusions that would affect the setting of traditional cultural properties. The Navy, Oregon State Historic Preservation Office (SHPO), Confederated Tribes of the Umatilla Indian (CTUIR), and Advisory Council on Historic Preservation (ACHP) prepared and signed a Memorandum of Agreement (October 2015) (Appendix C, Tribal and Cultural Correspondence) to resolve potential adverse effects on traditional cultural properties and establish protocols for protection and management of these resources, including a monitoring plan, in accordance with Section 106 of the NHPA. The Memorandum of Agreement includes stipulations for monitoring traditional cultural properties in cooperation with the CTUIR.

5.11.2.3 Proposed Mitigation Measures

No mitigation measures are required for archaeological resources, historic trails, or architectural resources because no NRHP-eligible or -listed archaeological resources, historic trails, or architectural resources would be impacted. Potential adverse effects on traditional cultural properties have been identified by the Navy in consultation with the CTUIR. The Navy, Oregon SHPO, CTUIR, and ACHP prepared and signed a Memorandum of Agreement (October 2015) to resolve adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA.

5.12 American Indian Traditional Resources

5.12.1 Current Requirements and Management Practices

The Navy manages the protection of American Indian traditional resources at NWSTF Boardman and conducts government-to-government consultation with the CTUIR, the Confederated Tribes of the Warm Springs of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe in accordance with the American Indian Religious Freedom Act, NAGPRA, and appropriate Navy Instructions. Plant and wildlife resources are managed in accordance with the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012).

5.12.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.12.2.1 Proposed Management Practices

The Navy would continue to manage the protection of American Indian traditional resources at NWSTF Boardman and conduct government-to-government consultation with the CTUIR, the Confederated Tribes of the Warm Springs of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe in accordance with the American Indian Religious Freedom Act, NAGPRA, and appropriate Navy Instructions. Plant and wildlife resources would continue to be managed in accordance with the *NWSTF Boardman INRMP* (U.S. Department of the Navy 2012).

5.12.2.2 Proposed Monitoring

Government-to-government consultation with CTUIR did not identify a need for additional monitoring of specific effects to American Indian traditional plant and animal resources. Therefore, no additional monitoring is proposed for American Indian traditional resources under the No Action, Alternative 1, or Alternative 2.

5.12.2.3 Proposed Mitigation Measures

Government-to-government consultation with CTUIR did not identify a need for mitigation measures for effects to American Indian traditional plant and animal resources. Therefore, mitigation measures are not proposed for American Indian traditional resources under the No Action, Alternative 1, or Alternative 2.

5.13 Public Health and Safety and Protection of Children

5.13.1 Current Requirements and Management Practices

There are specific and documented procedures in place to ensure that nonparticipants are not endangered by training actions. Medically trained personnel and first aid kits are on site for each training activity in the unlikely event of an injury. Monitored fences around NWSTF Boardman, and the use of gates and signs to control access, protect the public from potentially hazardous training activities. Monitoring of training events serves to identify potential public health and safety risks and avoid them.

- Current range control procedures at NWSTF Boardman limit unanticipated interactions with the public. Public access to NWSTF Boardman is controlled per NAS Whidbey Instruction 8020.8 Ground Entry/Access to NWSTF Boardman. NWSTF Boardman areas are fully fenced; entrance into these areas is controlled by unmanned gates. Signs also are posted to warn the public of potentially hazardous activities. Trainers and exercise participants are responsible for assuring that nonparticipants are not close enough that they are at risk during all training activities.
- NWSTF Boardman has a Hazardous Control and Management Plan, Authorized Use List, and a Hazard Communication Program. Material Safety Data Sheets are available for the hazardous materials stored there. Navy personnel at NWSTF Boardman receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials. NWSTF Boardman maintains a Conditionally Exempt Small Quantity Generator status for hazardous waste, and the facility is not required to have an Environmental Protection Agency Hazardous Waste Generator Identification number. Hazardous wastes are disposed of through local vendors (e.g., Safety Kleen provides a parts-cleaning service for vehicle maintenance). Some hazardous materials that are no longer needed at NWSTF Boardman are transported to NAS Whidbey Island for reassignment in compliance with the Hazardous Materials Transportation Act, U.S. Department of Transportation and Oregon Department of

Transportation regulations. Some of these materials may be determined to be excess at that point and may then be generated as hazardous wastes, but this would occur at NAS Whidbey Island.

- Currently, users on the ground of NWSTF Boardman are made aware of unexploded ordnance hazards by signage warning of areas where unexploded ordnance clearance has not been confirmed as well as safety briefings provided prior to conducting activities on NWSTF Boardman.

5.13.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.13.2.1 Proposed Management Practices

Current measures in place to ensure that nonparticipants are not endangered by actions at NWSTF Boardman would continue (see Section 3.12.3.5, Proposed Management Practices, Monitoring, and Mitigation Measures). The following MPs would be implemented to reduce hazards associated with unexploded ordnance:

- Post signs warning of areas where unexploded ordnance clearance has not been confirmed
- After range development, restrict movement of Soldiers using the training range to designated areas that are known to be free of any unexploded ordnance. In addition, supplemental unexploded ordnance clearance operations would be conducted prior to construction of range enhancements and operation of the proposed training ranges.

5.13.2.2 Proposed Monitoring

No additional monitoring needs were identified for public health and safety.

5.13.2.3 Proposed Mitigation Measures

Mitigation measures for other resources that affect public health and safety (e.g., Section 3.4, Noise) would be implemented. No additional mitigation measures are warranted.

5.14 Wildfire

5.14.1 Current Requirements and Management Practices

CNRNW has implemented a regional *Wildland Fire Management Plan*. The Navy is currently revising, updating, and expanding the specific portion of that plan applicable to NWSTF Boardman. The current fire strategy is provided below.

- Use the existing road system as the staging lines at which fires will be fought. The Navy currently maintains a system of 60 ft. wide fire breaks throughout NWSTF Boardman.
- A detachment of six Navy personnel are stationed at NWSTF Boardman. Their responsibilities are to maintain the buildings, roads, wells, fences, and other infrastructure and provide security in accordance with NAS Whidbey Instruction 3120.6 (NWSTF Boardman Standard Operating Procedures).
- Navy personnel stationed at NWSTF Boardman are required to hold Wildland Firefighting Red Cards. Additionally, the Navy personnel stationed at NWSTF Boardman are equipped with appropriate wildland protective clothing and NWSTF Boardman firefighters have nine vehicles assigned to them. however, three are used for actual firefighting operations: a dedicated firefighting vehicle (Type VI Brush truck), a General Services Administration truck that has a 250-gallon firefighting skid unit mounted (a “skid” is a water pump with a large water capacity

that sits in the rear of a flatbed truck), and a Model 19 fire engine (600-gallon tank). In addition, the Navy leases a tractor and disc during the four month fire season to maintain fire/fuel breaks. In extreme situations, the tractor could also be used for incipient wildland fire suppression efforts when the application of foam lines is unavailable, exhausted, or ineffective.

- The Navy previously had a mutual aid agreement for wildland fire response with UCD fire department. However, the Depot completed its mission in late 2011 and was closed down through the Base Realignment and Closure process. The fire department responsibilities have been transferred to the OMD, and a Mutual Aid Agreement was drafted and signed in 2013 and is effective through 2018.
- According to the CNRNW *Wildland Fire Management Plan*, a risk management decision process should be established that will determine the need for special orders and closures for work/training during extreme fire conditions. The goal of risk management is to safely sustain long term military use and training activities over short term work or training tasks. Planning and scheduling of appropriate training activities and matching supporting fire protection resources to training level of training activity during fire season are possible tools to reduce and mitigate wildfire risk. The risk management decision process will consider: military work/training priorities and minimum requirements; fire weather and fuel conditions; appropriate management responses; availability of wildland firefighting resources; military, public and community safety; and fire management zone priorities.
- Oregon Revised Statutes (ORS) require owners and operators of forestland to take appropriate action to control, extinguish, and report wildland fires regardless of origin (ORS §477.066). In addition, state law indicates that the ORNG shall be subject to the duties, requirements or penalties of ORS §477.068 (Liability for cost of abatement), ORS §477.085 (Liability for cost of protecting land within a forest protection district) and ORS §477.090 (Civil liability), where the origin or subsequent spread of a fire was the direct result of training activity by the ORNG. (ORS §477.095). For regulatory purposes, any undeveloped wildland is considered forestland, whether or not trees are present. In summary, the ORNG is liable for wildland fire control when the origin or subsequent spread of a fire was the direct result of training activity by the ORNG.

5.14.2 Proposed Management Practices, Monitoring, and Mitigation Measures

5.14.2.1 Proposed Management Practices

After an internal study, the DoD in 2001 signed and adopted standards contained within the Review and Update of the 1995 Federal Wildland Fire Management Policy. The Department of the Army subsequently issued its Army Wildland Fire Policy Guidance in 2002. The Army Wildland Fire Policy Guidance adopted the following policies and standards:

- Review and Update of the 1995 Federal Wildland Fire Management Policy (2001)
- National Wildfire Coordinating Group: PMS 310-1, Wildland Fire Qualification System Guide, June 2011 (or current version)
- National Fire Protection Association (NFPA): Standard 1051 – Standard for Wildland Fire Fighter Professional Qualifications, 2007 (or current version)
- NFPA: Standard 1143 – Standard for Wildland Fire Management, 2009 (or current version)
- NFPA: Standard 1144 – Standard for Reducing Structure Ignition Hazards from Wildland Fire, 2008 (or current version)
- NFPA: Standard 1561 – Standard on Emergency Services Incident Management System, 2008 (or current version)

- DoD Instruction 6055.06: DoD Fire and Emergency Services Program, December 21, 2006 (or current version)

In addition to the above policies and standards, the U.S. Army Wildland Fire Policy requires the development and implementation of an Integrated Wildfire Management Plan for all facilities and training lands subject to potential wildland fires.

The Navy has implemented the *Navy Region Northwest Fire Management Plan*. The Navy is currently revising, updating and expanding the specific portion of that plan applicable to NWSTF Boardman. The Navy, ORNG, and other range users would implement the *Draft NWSTF Boardman Integrated Wildland Fire Management Plan* (Appendix H) as part of the Proposed Action. The following MPs would be applied.

- The use of tracer rounds and other incendiary devices would be limited to periods when the risk of wildfire is at acceptable levels. Tracer rounds would be restricted during the fire season from May to October and use would require appropriate approval from NAS Whidbey Island. Tracer ammunition (tracer rounds) are bullets that are built with a small pyrotechnic charge in their base. Ignited by the burning powder, the pyrotechnic composition burns very brightly, making the projectile visible to the naked eye. This enables the shooter to follow the bullet trajectory in order to make aiming corrections.
- To determine if the wildfire risk is at an acceptable level for the use of aerial flares, smoke-grenades, and tracer rounds outside of the fire season, an internal Fire Danger Rating and Wildland Fire Risk Management Matrix would be utilized. This protocol utilizes weather data (temperature, relative humidity and precipitation), fire danger rating (low through extreme), military activity, firefighting assets available on site and other special considerations to identify the appropriate use of aerial flares and smoke-grenades.
- Use of aerial flares and smoke-grenades would be addressed on a case-by-case basis based on the risk assessment, application of ammunition, and timing during the fire season. Pyrotechnic devices, such as smoke grenades, are to be used in metal containments during high fire risk periods.
- Restrict mechanical equipment and weapons used during training to graveled surfaces. No off road driving would be allowed except for rare circumstances (e.g., firefighting) and with authorization.
- Parking would be allowed only in graveled pullouts or parking lots.
- Past agricultural-related fences that are no longer needed (internal to NWSTF Boardman's perimeter fence) would be removed, which would reduce fuel loading (by reducing the amount of fuel that can build up on the windward side of a fenceline) and increase fire response.
- Establish or repair and maintain water storage capabilities.
- The Navy currently maintains a system of 60 ft. (18.3 m) wide fire breaks throughout NWSTF Boardman. In addition to these fire breaks, roads and trails that are already part of NWSTF Boardman would act as minor fire breaks in the event of low intensity fires. However, approximately 219.6 ac. (88.9 ha) of existing fire breaks will be no longer be maintained by disking, and will be revegetated to native short grasses. The fire break system will also be modified with the addition of 19.2 ac. (7.8 ha) of new fire breaks. Section 3.13 (Wildfire) and Appendix H (Draft Integrated Wildfire Management Plan) present the recommended modifications to the NWSTF Boardman fire break system.
- Smoking during operation or use of the proposed training ranges would be banned except in authorized smoking areas.

- Fire prevention protocols developed in the Draft NWSTF Boardman Integrated Wildfire Management Plan would be included in the SOPs and emphasized during the facility orientation and safety briefing.
    - All units training at NWSTF Boardman are to be briefed on wildfire hazards. Briefings include instructions on reporting fires to Range Control, and procedures for fires occurring down range.
    - All maintained roads within NWSTF Boardman are considered fire breaks. A number of roads also have additional fire breaks disked alongside the road. Range Operations personnel also clear vegetation from roads and reduce tumbleweed accumulations along fence lines annually.
    - On high, very high, and extreme fire danger days, the Oregon Army National Guard (ORARNG) Fire Captain will recommend either modifying, limiting, or prohibiting the use of pyrotechnics.
- The possibility of yearly fires exists within the heaviest use areas (i.e., weapons training ranges). Proper implementation of the *Draft NWSTF Boardman Integrated Wildfire Management Plan* would reduce the risk of large spread fires. The Draft NWSTF Boardman Integrated Wildfire Management Plan would be reviewed, and appropriate changes considered on an annual basis.

Additionally, NAS Whidbey Island is currently working on a wildfire response plan for Boardman to request response from NAS Whidbey Island for large-scale fires. This NAS Whidbey Island wildland fire response would include seven qualified personnel, equipment and vehicles. Because of the distance between NWSTF Boardman and NAS Whidbey Island, it would be expected to have a 6- to 8-hour response time.

The ORNG would have a trained, dedicated fire crew and a wildland fire truck on-site during weapons training during times of high fire risk. The ORNG also would have CH-47 or CH-60 helicopter with aerial firefighting capability available or a Single Engine Air Tanker contracted for use during high fire risk seasons. During live fire operations, the ORNG would typically have one Type VI Brush Truck. In extreme situations, the OMD can provide one Type VII and up to three Type VI Bush Trucks with water and WFFF (Foam) capability, two to six personnel with Wildland Fire Red Card training, one Lead Forest Officer/Fire Captain, as well as ORNG aviation assets.

5.14.2.2 Proposed Monitoring

Military personnel would monitor for fire at all times during range operations from observation towers and while on patrols. Post-operation fire monitoring training would be conducted by range operators while conducting range clearance duties.

5.14.2.3 Proposed Mitigation Measures

No mitigation measures are warranted for wildfire based on the analysis presented in Section 3.13.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures) and implementation of proposed MPs and monitoring.

6 OTHER CONSIDERATIONS REQUIRED BY THE NATIONAL ENVIRONMENTAL POLICY ACT

6.1 POSSIBLE CONFLICTS WITH OBJECTIVES OF FEDERAL, STATE, AND LOCAL PLANS, POLICIES, AND CONTROLS

Implementation of the Proposed Action for the Naval Weapons Systems Training Facility (NWSTF) Boardman Environmental Impact Statement (EIS) would not conflict with the objectives or requirements of federal, state, regional, or local plans, policies, or legal requirements. The United States (U.S.) Department of the Navy (Navy) and Oregon National Guard (ORNG) have consulted with regulatory agencies as appropriate during the National Environmental Policy Act (NEPA) process and prior to implementation of the Proposed Action to ensure requirements are met.

Table 6-1 provides a summary of environmental compliance requirements that may apply. Agency correspondence can be found in Appendix B and supporting documentation can be found on the NWSTF Boardman EIS website at www.nwstfboardmaneis.com.

6.2 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This means that choosing one option may reduce future flexibility in pursuing other options, or that committing a resource to a certain use may often eliminate the possibility for other uses of that resource.

The majority of activities addressed in this EIS would be categorized as long-term. For example, although the use of training areas for individual training activities may be of short duration, the training areas would continue to receive increased and repeated use for the foreseeable future. As the proposed action includes an increase in training tempo, areas designated for training would accommodate a higher level of operational uses in the long-term, which would, in turn, affect the long-term productivity of environmental resources in those areas. Addressing such shortfalls through planning and accommodation of future training tempo requirements and deployment schedules will allow the Navy and ORNG to more readily facilitate long-term resource management strategies while achieving the near-term goal of providing the capacity and capabilities to fully support required training tasks and meet the Title 10 and Title 32 mandates.

Table 6-1: Summary of Environmental Compliance for the Proposed Action

Plans, Policies, and Controls	Status of Compliance
NEPA of 1969 (42 U.S.C. §§4321 et seq.)	This EIS was prepared in compliance with NEPA (42 U.S.C. §4321 et seq.), CEQ Regulations for Implementing the Procedural Provisions of NEPA (Title 40 C.F.R §§1500–1508), Navy Procedures for Implementing NEPA (32 C.F.R §775), and Environmental Analysis of Army Actions (32 C.F.R §651) which also covers Army National Guard activities.
ESA (16 U.S.C. §§1531 et seq.)	No federally listed or proposed endangered or threatened species occur in the NWSTF Boardman Study Area. Therefore, ESA requirements do not apply to the Proposed Action. The Washington ground squirrel, which is a candidate species, does occur in the Study Area. While candidate species receive no statutory protection under ESA, the Navy and ORNG engaged in conferencing with USFWS under 50 C.F.R. §402.10 despite the species only being a candidate so that future proposed activities will not require significant additional consultation. 50 C.F.R. §402.10 allows for measures considered in conferencing to be formalized in a future biological opinion upon the listing of the species. Until that point when a take statement would be required, measures developed through conferencing would only be voluntary and not binding under ESA.
MBTA (16 U.S.C. §§703–712)	**Non-Military Readiness Activities** Best management practices would be implemented during construction of the proposed range enhancements to avoid take of migratory birds. In addition, migratory bird conservation measures would continue to be implemented under the *NWSTF Boardman Integrated Natural Resources Management Plan* in accordance with the DoD and USFWS Memorandum of Understanding to Promote the Conservation of Migratory Birds. Non-military readiness activities associated with the Proposed Action would comply with the MBTA. **Military Readiness Activities** The Navy obtained technical input from the USFWS for the analysis of potential impacts on migratory birds in accordance with the DoD and USFWS Memorandum of Understanding to Promote the Conservation of Migratory Birds. Based on the analysis in Section 3.6 (Wildlife), the Navy has determined that military readiness activities under the Proposed Action would not have a significant adverse effect on a population of a migratory bird species, as defined in the Final Rule authorizing the DoD to take migratory birds during military readiness activities (50 C.F.R. Part 21). Therefore, in accordance with the Final Rule, the Navy is not required to confer with USFWS.
CAA (42 U.S.C. §§7401 et seq.); CAA General Conformity Rule (40 C.F.R. §93[B])	The air quality analysis conducted for this EIS indicates that the Proposed Action would not cause National Ambient Air Quality Standards to be exceeded. The Study Area is not located within a nonattainment or maintenance area. Therefore, the General Conformity Rule does not apply.

Table 6-1: Summary of Environmental Compliance for the Proposed Action (continued)

Plans, Policies, and Controls	Status of Compliance
RCRA (42 U.S.C. §6901, et seq.)	Small quantities of hazardous waste would continue to be generated in the Administration Area and at the proposed UAS Facility. It is expected that the current Conditionally Exempt Small Quantity Generator status would be maintained. Hazardous wastes would continue to be safely disposed of through local vendors.
The Sikes Act of 1960 (16 U.S.C. §§670a–670o, as amended by the Sikes Act Improvement Act of 1997, Pub. L. No. 105-85)	In accordance with the Sikes Act, an *Integrated Natural Resources Management Plan* has been prepared and implemented at NWSTF Boardman in cooperation with the USFWS and the Oregon Department of Fish and Wildlife. The Plan is reviewed by the parties annually as to operation and effect, and is updated as necessary. The Plan will be updated to reflect natural resources management changes brought about by the Proposed Action.
NHPA (54 U.S.C. §§300101 et seq.)	In accordance with Section 106 of the NHPA, the Navy has determined that no historic properties would be adversely affected by implementation of the Proposed Action, pending the completion of Native American consultation, concurrence by the Oregon State Historic Preservation Office with the 2011 Phase I report findings, and concurrence with a finding of “No Historic Properties Affected.” No American Indian traditional cultural properties have been identified in the direct APE; however, American Indian traditional cultural properties have been identified in the indirect APE. The Navy, in consultation with the CTUIR, determined that noise and visual intrusions associated with aircraft overflights and noise associated with weapons firing on the proposed ranges would have an adverse effect on traditional cultural properties. The Navy, Oregon SHPO, CTUIR, and ACHP prepared a Memorandum of Agreement (signed in October 2015, Appendix C) to resolve adverse effects on traditional cultural properties and establish protocols for protection and management of these resources in accordance with Section 106 of the NHPA.
Archaeological Resources Protection Act (ARPA) (16 U.S.C. §470aa–mm)	No impacts on archaeological sites would occur as a result of the implementation of the Proposed Action because no archaeological sites eligible for listing in the NRHP are located in the area of potential effects. In the event of inadvertent discovery of sensitive archaeological materials during construction, the Navy and ORNG would ensure that measures are taken promptly to protect the find from disturbance, assess the significance of the discovery, and implement appropriate mitigation measures for significant resources. Inadvertent discovery of sensitive archaeological materials would be handled in accordance with the appropriate Standard Operating Procedures, which includes provisions for stopping work and notifying the Oregon State Historic Preservation Office, Native American Tribes and other appropriate parties of the find.
Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. §3001)	No American Indian resources that qualify for NAGPRA have been identified in the area of potential effects. If such resources are discovered, the Navy will comply with NAGPRA and continue consultations with federally recognized tribes.
Emergency Planning and Right-to-Know Act (EPCRA)	EPCRA is applicable to the Proposed Action because small quantities of hazardous materials would be stored on site. Section 312 (“Tier Two”) reporting applies; this requirement is satisfied by complying with the state of Oregon’s counterpart regulations. Under the Proposed Action, the Navy and ORNG would not manufacture, store, or otherwise use hazardous chemicals above Toxics Release Inventory (Emergency Planning and Community Right-to-Know Act Section 313) reporting thresholds.

Table 6-1: Summary of Environmental Compliance for the Proposed Action (continued)

Plans, Policies, and Controls	Status of Compliance
Farmland Protection Policy Act (FPPA)	No impacts on farmlands would occur as a result of the implementation of the Proposed Action because no farmland would be irreversibly converted to non-agricultural uses.
Federal Noxious Weed Act (FNWA) (7 U.S.C. §2801 et seq.)	The Navy implements invasive plant and weed controls annually at NWSTF Boardman based on available funding and identified priorities. Construction and operation of the proposed new ranges would exacerbate existing invasive plant problems. Several mitigation measures would be implemented to avoid invasive plant infestations, monitor invasive plants, and adaptively manage invasive plants during construction and over the life of the proposed training ranges. In addition to project specific mitigations, in compliance with the FNWA, a NWSTF Boardman-wide invasive plant and noxious weed management plan has been prepared and will be implemented as part of the *NWSTF Boardman Integrated Natural Resources Management Plan*.
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	The Navy and ORNG have addressed requirements of EO 12898 in the EIS and have determined that implementation of the Proposed Action would not result in any disproportionately high and adverse human health or environmental effects on minority or low-income populations.
EO 13045, Protection of Children from Environmental Health Risks and Safety Risks	The Navy and ORNG have addressed requirements of EO 13045 in the EIS and have determined that implementation of the Proposed Action would not result in disproportionate environmental health or safety risks to children.
EO 13175 Consultation and Coordination with Indian Tribal governments	The Commander, U.S. Pacific Fleet invited the following federally recognized American Indian tribes to initiate government-to-government consultation in October 2010: the Confederate Tribes of the Umatilla Indian Reservation(CTUIR), the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe. As summarized in Appendix C, the Navy's government-to-government consultation with the CTUIR included correspondence, tribal briefings, staff-level consultation phone calls, emails, and meetings, which lead to a formal government-to-government meeting between the CTUIR Board of Trustees and the Commanding Officer of Naval Air Station Whidbey Island on 11 July 2013. Government-to-government consultation for the Proposed Action concluded in October 2015 with a signed Memorandum of Agreement between the Navy, the Oregon State Historic Preservation Office, and the CTUIR. The Memorandum of Agreement is provided in Appendix C. The Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe did not request government-to-government based on the Navy’s October 2010 invitation or subsequent communications.
EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management	In accordance with EO 13423, construction of new range facilities will be in compliance with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings.

Table 6-1: Summary of Environmental Compliance for the Proposed Action (continued)

Plans, Policies, and Controls	Status of Compliance
EO 13112 Invasive Species	Executive Order 13112 requires agencies to identify actions that may affect the status of invasive species and take measures to avoid introduction and spread of these species. To the extent invasive species management relates to compliance on NWSTF Boardman, a NWSTF Boardman-wide invasive plant and noxious weed management plan has been prepared and will be implemented as part of the *NWSTF Boardman Integrated Natural Resources Management Plan*, which ensures compliance with EO 13112.
EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance	In accordance with EO 13514 to create a sustainable energy economy and demonstrate the federal government's commitment to reducing green house gas emissions, the Navy is committed to improving energy security and environmental stewardship by reducing reliance on fossil fuels. The Navy is actively developing and participating in energy, environmental, and climate change initiatives that will increase use of alternative energy and help conserve the world's resources for future generations.

Notes: NEPA = National Environmental Policy Act, U.S.C. = United States Code, C.F.R. = Code of Federal Regulations, CEQ = Council on Environmental Quality, EO = Executive Order, EIS = Environmental Impact Statement, ORNG = Oregon National Guard, ESA = Endangered Species Act, MBTA = Migratory Bird Treaty Act, DoD = Department of Defense, CAA = Clean Air Act, RCRA = Resource Conservation and Recovery Act, NHPA = National Historic Preservation Act, EPCRA = Emergency Planning and Right-to-Know Act, FPPA = Farmland Protection Policy Act, USFWS = United States Fish and Wildlife Service, NWSTF = Naval Weapons Systems Training Facility, Navy = U.S. Department of the Navy, UAS = Unmanned Aerial Systems, FNWA = Federal Noxious Weed Act, U.S. = United States, CTUIR = Confederated Tribes of the Umatilla Indian Reservation, MOA = Military Operations Area, NRHP = National Register of Historic Places

6.3 Irreversible or Irretrievable Commitment of Resources

NEPA requires that environmental analysis include identification of "any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy or minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., the disturbance of a cultural site).

Construction activities associated with the proposed action at NWSTF Boardman would result in the irretrievable commitment of shrub-steppe habitat currently used by numerous species at NWSTF Boardman. The construction of new range enhancements would also result in the irretrievable commitment of nonrenewable energy resources, primarily in the form of fossil fuels (including fuel oil), natural gas, and diesel construction equipment. Implementation of the proposed action would require fuels used by aircraft, and ground-based vehicles. Since fixed- and rotary-wing flights would increase at NWSTF Boardman, total fuel use would also increase. Fuel use by ground-based vehicles involved in training activities would also increase. Therefore, total fuel consumption would increase and this nonrenewable resource would be considered irreversibly lost.

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SECTION 3.12 PUBLIC HEALTH AND SAFETY AND PROTECTION OF CHILDREN

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CHAPTER 4 CUMULATIVE IMPACTS

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CHAPTER 5 MITIGATION MEASURES

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CHAPTER 6 OTHER CONSIDERATIONS REQUIRED BY NEPA

There are no references in this section.

CHAPTER 7 LIST OF PREPARERS

There are no references in this section.

9 DISTRIBUTION LIST

Following is a list of public officials, government agencies, American Indian Tribes and Nations, and representatives from organizations and private companies who attended public meetings, provided comments during the Environmental Impact Statement (EIS) process, or have been identified by the Navy to be on the distribution list for the Naval Weapons Systems Training Facility (NWSTF) Boardman EIS.

Information Repositories

Multnomah County Library – Central Library, Non-profit Resource Center, Portland, OR

Oregon Trail Library District – Boardman Library, Boardman, OR

Oregon Trail Library District – Heppner Branch, Heppner, OR

Salem Public Library – Central Branch, Salem, OR

Salem Public Library – West Salem Branch, Salem, OR

Stafford Hansell Government Center, Hermiston, OR

Federal Regulatory Agencies

Federal Energy Regulatory Commission

U.S. Department of Agriculture

- U.S. Forest Service, Heppner Service Center
- U.S. Forest Service, Mount Hood National Forest
- U.S. Forest Service, Pacific Northwest Region
- U.S. Forest Service, Umatilla National Forest, Heppner Ranger District
- U.S. Forest Service, Mount Hood National Forest, Cascade Crossing Project Manager
- U.S. Forest Service, Wallowa-Whitman National Forest, Whitman District Office, Baker City Office

U.S. Department of Defense, Region 10

U.S. Department of Energy

- Bonneville Power Administration

U.S. Department of the Interior

- Bureau of Indian Affairs, Northwest Regional Office
- Bureau of Land Management, John Day Snake Resource Advisory Council
- Bureau of Land Management, National Historic Oregon Trail Interpretive Center, Trail Tenders
- Bureau of Land Management, Oregon State Office
- Bureau of Land Management, Prineville District Office
- Bureau of Land Management, Vale District
- Bureau of Land Management, Vale District, Baker Office
- Bureau of Land Management, Burns District
- Office of Environmental Policy and Compliance
- U.S. Fish and Wildlife Service
- U.S. Fish and Wildlife Service, La Grande Field Office
- U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office
- U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, Endangered Species Division
- U.S. Fish and Wildlife Service, Pacific Region

U.S. Department of Transportation

- Federal Aviation Administration, Headquarters, Washington, D.C.
- Federal Aviation Administration, Seattle Airports District Office

U.S. Environmental Protection Agency

- NEPA Compliance Division (Washington, D.C.)
- Region X
- Region X, Compliance and Enforcement
- Region X, Oregon Operations Office
- Region X, Environmental Review and Sediment Management Unit

U.S. Geological Survey, Northwest Region U.S. National Park Service

- Pacific West Region
- National Trails Intermountain Region

Umatilla Chemical Disposal Outreach Office

State Regulatory Agencies

Oregon Department of Air Quality

Oregon Department of Agriculture, Natural Resources

Oregon Department of Aviation

Oregon Department of Energy

Oregon Department of Energy, Communications Development

Oregon Department of Energy, Energy Facility Siting Council

Oregon Department of Environmental Quality

Oregon Department of Fish and Wildlife

- Northeast Region Office
- Northeast Region, Heppner Field Office

Oregon Department of Forestry

Oregon Department of Geology and Mineral Industries, Portland Office

Oregon Department of Land Conservation and Development

Oregon Department of Land Conservation and Development, Community Services Division, Eastern Oregon University Regional Solutions Center

Oregon Department of Parks and Recreation

Oregon Department of Parks and Recreation, Heritage Programs, Oregon Historic Trails Advisory Council

Oregon Department of State Lands

- Energy Facility Siting Council
- Office of Emergency Management
- Invasive Species Council
- Legislative Commission on Indian Services
- State Fire Marshal
- State Historic Preservation Office
- Water Resources Department
- Water Resources Department, North Central Region

Oregon Department of Transportation

Washington Department of Fish and Wildlife

State of Oregon, Oregon Regional Solutions Center for Eastern Oregon

State of Oregon, Military and Veterans Affairs

Local Agencies

Boardman Police Department

Boardman Rural Fire Protection District

City Managers/Recorders

- City of Boardman
- City of Heppner
- City of Hermiston
- City of Ione
- City of Irrigon
- Town of Lexington
- City of Pendleton
- City of Umatilla

East Umatilla County Rural Fire Department

Gilliam County Court

Gilliam County Fire Service

Gilliam County Planning Department

Gilliam County Sheriff's Office

South Gilliam County Rural Fire Protection District

Heppner Fire Department

Hermiston Airport Advisory Committee

Hermiston Fire and Emergency Services

Lexington Fire Department

Morrow County Court

Morrow County Emergency Management

Morrow County Planning Department

Morrow County Public Works Department

- Anson Wright Park
- Cutsforth Park

Morrow County Sheriff's Office

Morrow County Soil and Water Conservation District

Port of Morrow

Umatilla Basin Water Commission

Umatilla County

- Department of Resource Services and Development

Umatilla Rural Fire Protection District

American Indian Tribes and Nations

Confederated Tribes and Bands of the Yakama Nation

Confederated Tribes of the Umatilla Indian Reservation

Confederated Tribes of the Warm Springs Reservation of Oregon

Nez Perce Tribe

Federal Elected Officials

U.S. Representative
Hon. Suzanne Bonamici,
OR District 1

U.S. Representative
Hon. Greg Walden,
OR District 2

U.S. Representative
Hon. Earl Blumenaur,
OR District 3

U.S. Representative
Hon. Peter DeFazio,
OR District 4

U.S. Representative
Hon. Kurt Schrader,
OR District 5

U.S. Senator
Hon. Jeff Merkley, OR

U.S. Senator
Hon. Ron Wyden, OR

State Elected Officials

Governor of Oregon
Hon. Kate Brown

Oregon State Senator
Hon. Jeff Kruse,
OR District 1

Oregon State Senator
Hon. Herman Baertschiger, Jr.,
OR District 2

Oregon State Senator
Hon. Alan Bates,
OR District 3

Oregon State Senator
Hon. Floyd Prozanski,
OR District 4

Oregon State Senator
Hon. Arnie Roblan,
OR District 5

Oregon State Senator
Hon. Lee Beyer,
OR District 6

Oregon State Senator
Hon. Chris Edwards,
OR District 7

Oregon State Senator
Hon. Sara Gelser,
OR District 8

Oregon State Senator
Hon. Fred Girod,
OR District 9

Oregon State Senator
Hon. Jackie Winters,
OR District 10

Oregon State Senator
Hon. Peter Courtney,
OR District 11

Oregon State Senator
Hon. Brian Boquist,
OR District 12

Oregon State Senator
Hon. Kim Thatcher,
OR District 13

Oregon State Senator
Hon. Mark Hass,
OR District 14

Oregon State Senator
Hon. Chuck Riley,
OR District 15

Oregon State Senator
Hon. Betsy Johnson,
OR District 16

Oregon State Senator
Hon. Elizabeth Steiner Hayward,
OR District 17

Oregon State Senator
Hon. Ginny Burdick,
OR District 18

Oregon State Senator
Hon. Richard Devlin,
OR District 19

Oregon State Senator
Hon. Alan Olsen,
OR District 20

Oregon State Senator
Hon. Diane Rosenbaum,
OR District 21

Oregon State Senator
Hon. Chip Shields,
OR District 22

Oregon State Senator
Hon. Michael Dembrow,
OR District 23

Oregon State Senator
Hon. Rod Monroe,
OR District 24

Oregon State Senator
Hon. Laurie Monnes Anderson,
OR District 25

Oregon State Senator
Hon. Chuck Thomsen,
OR District 26

Oregon State Senator
Hon. Tim Knopp,
OR District 27

Oregon State Senator
Hon. Doug Whitsett,
OR District 28

Oregon State Senator
Hon. Bill Hansell,
OR District 29

Oregon State Senator
Hon. Ted Ferrioli,
OR District 30

Oregon State Representative
Hon. Wayne Krieger,
OR District 1

Oregon State Representative
Hon. Dallas Heard,
OR District 2

Oregon State Representative
Hon. Carl Wilson,
OR District 3

Oregon State Representative
Hon. Duane A. Stark,
OR District 4

Oregon State Representative
Hon. Peter Buckley,
OR District 5

Oregon State Representative
Hon. Sal Esquivel,
OR District 6

Oregon State Representative
Hon. Cedric Hayden,
OR District 7

Oregon State Representative
Hon. Paul Holvey,
OR District 8

Oregon State Representative
Hon. Caddy McKeown,
OR District 9

Oregon State Representative
Hon. David Gomberg,
OR District 10

Oregon State Representative
Hon. Phil Barnhart,
OR District 11

Oregon State Representative
Hon. John Lively,
OR District 12

Oregon State Representative
Hon. Nancy Nathanson,
OR District 13

Oregon State Representative
Hon. Val Hoyle,
OR District 14

Oregon State Representative
Hon. Andy Olson,
OR District 15

Oregon State Representative
Hon. Dan Rayfield,
OR District 16

Oregon State Representative
Hon. Sherrie Sprenger,
OR District 17

Oregon State Representative
Hon. Vic Gilliam,
OR District 18

Oregon State Representative
Hon. Jodi Hack,
OR District 19

Oregon State Representative
Hon. Paul Evans,
OR District 20

Oregon State Representative
Hon. Brian Clem,
OR District 21

Oregon State Representative
Hon. Betty Komp,
OR District 22

Oregon State Representative
Hon. Mike Nearman,
OR District 23

Oregon State Representative
Hon. Jim Weidner,
OR District 24

Oregon State Representative
Hon. Bill Post,
OR District 25

Oregon State Representative
Hon. John Davis,
OR District 26

Oregon State Representative
Hon. Tobias Read,
OR District 27

Oregon State Representative
Hon. Jeff Barker,
OR District 28

Oregon State Representative
Hon. Susan McLain,
OR District 29

Oregon State Representative
Hon. Joe Gallegos,
OR District 30

Oregon State Representative
Hon. Brad Witt,
OR District 31

Oregon State Representative
Hon. Deborah Boone,
OR District 32

Oregon State Representative
Hon. Mitch Greenlick,
OR District 33

Oregon State Representative
Hon. Ken Helm,
OR District 34

Oregon State Representative
Hon. Margaret Doherty,
OR District 35

Oregon State Representative
Hon. Jennifer Williamson,
OR District 36

Oregon State Representative
Hon. Julie Parrish,
OR District 37

Oregon State Representative
Hon. Ann Lininger,
OR District 38

Oregon State Representative
Hon. Bill Kennemer,
OR District 39

Oregon State Representative
Hon. Brent Barton,
OR District 40

Oregon State Representative
Hon. Kathleen Taylor,
OR District 41

Oregon State Representative
Hon. Rob Nosse,
OR District 42

Oregon State Representative
Hon. Lew Frederick,
OR District 43

Oregon State Representative
Hon. Tina Kotek,
OR District 44

Oregon State Representative
Hon. Barbara Smith Warner,
OR District 45

Oregon State Representative
Hon. Alissa Keny-Guyer,
OR District 46

Oregon State Representative
Hon. Jessica Vega Pederson,
OR District 47

Oregon State Representative
Hon. Jeff Reardon,
OR District 48

Oregon State Representative
Hon. Chris Gorsek,
OR District 49

Oregon State Representative
Hon. Carla C. Piluso,
OR District 50

Oregon State Representative
Hon. Shemia Fagan,
OR District 51

Oregon State Representative
Hon. Mark Johnson,
OR District 52

Oregon State Representative
Hon. Gene Whisnant,
OR District 53

Oregon State Representative
Hon. Knute Buehler,
OR District 54

Oregon State Representative
Hon. Mike McLane,
OR District 55

Oregon State Representative
Hon. Gail Whitsett,
OR District 56

Oregon State Representative
Hon. Greg Smith,
OR District 57

Oregon State Representative
Hon. Greg Barreto,
OR District 58

Oregon State Representative
Hon. John E. Huffman,
OR District 59

Oregon State Representative
Hon. Cliff Bentz,
OR District 60

Local Elected Officials

City of Boardman
Hon. Sandy Toms
Mayor

City of Boardman
Hon. David Jones
City Councilmember

City of Boardman
Hon. Marc Rogelstad
City Councilmember

City of Boardman
Hon. Brandon Hammond
City Councilmember

City of Boardman
Hon. Art Kegler
City Councilmember

City of Boardman
Hon. Del Turner
City Councilmember

City of Boardman
Hon. Brenda Profitt
City Councilmember

City of Heppner
Hon. Skip Matthews
Mayor

City of Heppner
Hon. John Bowles
City Councilmember

City of Heppner
Hon. Joanne Burleson
City Councilmember

City of Heppner
Hon. Teresa Bedortha
City Councilmember

City of Heppner
Hon. Corey Sweeney
City Councilmember

City of Heppner
Hon. Dale Bates
City Councilmember

City of Heppner
Hon. Adam Doherty
City Councilmember

City of Hermiston
Hon. Dr. David Drotzmann
Mayor

City of Hermiston
Hon. Clara Beas-Fitzgerald
City Councilmember

City of Hermiston
Hon. Manuel Gutierrez
City Councilmember

City of Hermiston
Hon. Lori Davis
City Councilmember

City of Hermiston
Hon. Rod S. Hardin
City Councilmember

City of Hermiston
Hon. Douglas Smith
City Councilmember

City of Hermiston
Hon. John Kirwan
City Councilmember

City of Hermiston
Hon. Doug Primmer
City Councilmember

City of Hermiston
Hon. Jackie C. Myers
City Councilmember

City of Ione
Hon. Linda LaRue
Mayor

City of Ione
VACANT
City Councilmember

City of Ione
Hon. Tobey Garrett
City Councilmember

City of Ione
Hon. Beverly Crum
City Councilmember

City of Ione
Hon. Mark Anderson
City Councilmember

City of Ione
Hon. Deacon Heideman
City Councilmember

City of Ione
Hon. Kristy Jones
City Councilmember

City of Irrigon
Hon. Sam Heath
Mayor

City of Irrigon
Hon. Arnold Theisen
City Councilmember

City of Irrigon
Hon. Michelle Hagen
City Councilmember

City of Irrigon
Hon. Ken Matlack
City Councilmember

City of Irrigon
Hon. Margaret Anderson
City Councilmember

City of Irrigon
Hon. Daren Strong
City Councilmember

City of Irrigon
Hon. Christine Sorenson
Mayor Pro-Tem

City of Pendleton
Hon. Phil Houk
Mayor

City of Pendleton
Hon. McKennon McDonald
City Councilmember

City of Pendleton
Hon. Neil Brown
City Councilmember

City of Pendleton
Hon. Tom Young
City Councilmember

City of Pendleton
Hon. Chuck Wood
City Councilmember

City of Pendleton
Hon. John Brenne
City Councilmember

City of Pendleton
Hon. Becky Marks
City Councilmember

City of Pendleton
Hon. Jane Hill
Member at-large

City of Pendleton
Hon. Al Plute
Member at-large

City of Umatilla
VACANT
Mayor

City of Umatilla
Hon. Lyle Smith
City Councilmember

City of Umatilla
Hon. George Fenton
City Councilmember

City of Umatilla
Hon. Mel Ray
City Councilmember

City of Umatilla
Hon. Roak TenEyck
City Councilmember

City of Umatilla
Hon. Sharon Farnsworth
City Councilmember

City of Umatilla
Hon. Mary Dedrick
City Councilmember

Town of Lexington
Hon. Arletta Arnspiger
Mayor

Town of Lexington
Hon. Bill Beard
City Councilmember

Town of Lexington
Hon. Deona Siex
City Councilmember

Town of Lexington
VACANT
City Councilmember

Town of Lexington
VACANT
City Councilmember

Gilliam County
Hon. Michael Weimar
Commissioner

Gilliam County
Hon. Dennis Gronquist
Commissioner

Morrow County Court
Hon. Don Russell
Commissioner

Morrow County Court
Hon. Leann Rea
Commissioner

Morrow County Court
Hon. Terry Tallman
County Judge

Umatilla County Commission
Hon. George Murdock
Commissioner, Position 1

Umatilla County Commission
Hon. Larry Givens
Commissioner, Position 2

Umatilla County Commission
Hon. Bill Elfering
Commissioner, Position 3

Union County Commission
Hon. Mark Davidson
Commissioner

Union County Commission
Hon. Jack Howard
Commissioner

Union County Commission
Hon. Steve McClure
Commissioner

Nongovernmental Organizations

Aircraft Owners and Pilots Association

- Northwest Mountain Region

American Council on Renewable Energy

American Wind and Wildlife Institute

American Wind Energy Association

Audubon Society

- East Cascades Chapter
- Portland Chapter
- Salem Chapter

Boardman Chamber of Commerce

Center for Columbia River History

Defenders of Wildlife, Northwest Office

Earth Justice National Headquarters

Earth Justice Northwest Regional Office

Environmental and Energy Study Institute

Florence Airport Volunteer Group

Group Against Smog and Pollution

Heppner Chamber of Commerce

Heppner Lions Club

Hermiston Chamber of Commerce

Hermiston Lions Club

Hermiston Rotary Club

Irrigon Chamber of Commerce

Morrow County Historical Society

Morrow County Museum

National Wildlife Federation

National Wildlife Federation, Pacific Regional Center

National Wind Coordinating Collaborative

Natural Resource Defense Council

Northwest Environmental Defense Center

Oregon Natural Desert Association

Oregon Pilots Association

Oregon Renewable Energy Center at the Oregon Institute of Technology

Oregon Small Wind Energy Association

Oregon-California Trail Association, Northwest Chapter

Pacific Environmental Advocacy Center

The Nature Conservancy

The Nature Conservancy, Oregon Main Office

U.S. Navy League, Portland Chapter

Umatilla Chamber of Commerce

Private Companies

Baseline Wind Energy Facility

Boardman Tree Farm/Poplar Tree Farm

Caithness Energy

Diversified Wind Projects, LLC

Earl L. Aylett Farms

Eastern Oregon Stewardship Services

Gas Transmissions Northwest

Hale Companies

Iberdrola Renewables

- Leaning Juniper Wind Power Facility
- Montague Wind Power Facility

Idaho Power

Infrared Baron, Inc.

IRZ

Madison Farms

Oregon Wind Farms, LLC

Pacific Power

Portland General Electric Company

- Transmission Projects

Rock Creek Wind Power, LLC

Saddle Butte Wind, LLC

Sullivan Farms

Threemile Canyon Farms

Turner-Lindsay Farms, LLC

Umatilla Electric Cooperative